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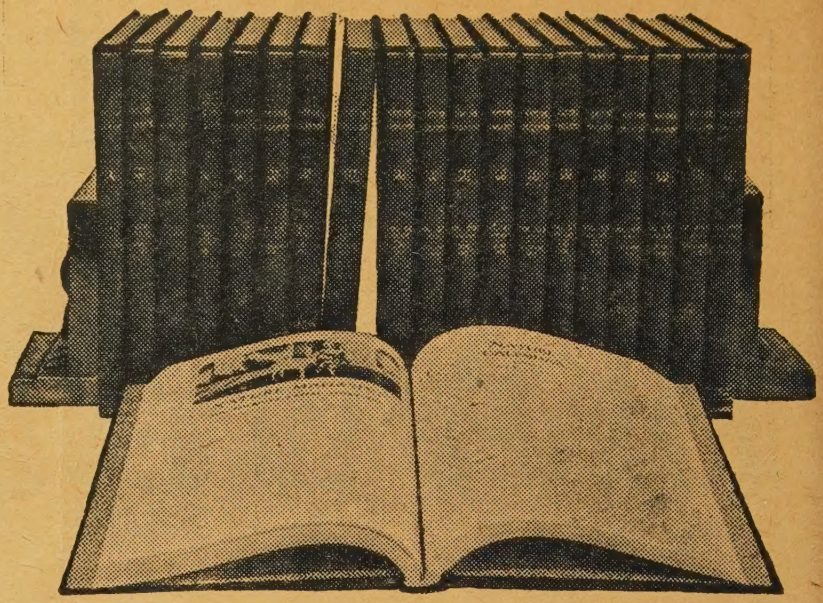

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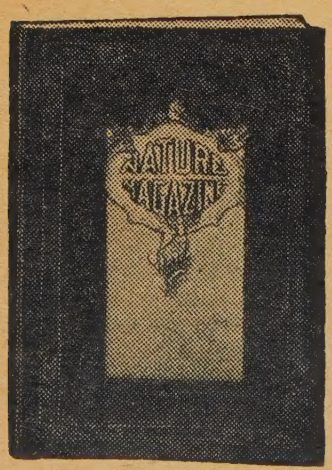

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African Wildlife

For a long time the Wild Life Protection Society of South Africa, established in 1920, had dreamed of a publication. This dream became reality with the publication of the first issue of *African Wild Life*, an 88-page, quarterly magazine with many illustrations and interesting articles. The Society, whose president is J. H. Orpen, has been primarily responsible for the creation of wildlife conservation sentiment in South Africa, and is equally devoted to the preservation of its flora. Among the interesting articles in this first issue is one about Paul Kruger and his active concern for preservation of the country's fauna. The price of this magazine is two shillings, sixpence an issue, and an annual membership in the organization is one pound, one shilling. The address of the secretary, W. C. Pitchford, is P.O. Box 1742, Johannesburg, South Africa.

International Parks

Appointment of a revised membership to the International Park Commission, created in 1936 to plan and establish international parks and allied areas along the Mexican-United States border, has been announced. Reactivation of the Mexican membership is expected to forward such projects, which might include an extension of the Big Bend National Park in Texas into a contiguous national park in Mexico. United States members of the commission are M. R. Tillotson, Lawrence M. Lawson, Hillory A. Tolson, P. V. Woohead, Conrad L. Wirth, Willian H. Zek, Jesse L. Nusbaum and John C. Gatlin.

Birds of the Keys

Birds of the Lower Florida Keys. By Earle R. Greene. Tallahassee, Florida. 1946. Florida Academy of Sciences and Florida Audubon Society. 68 pages. Illustrated.

For three years the author of this book served as manager of the Great White Heron and Key West Wildlife Refuges of the U. S. Fish and Wildlife Service. This assignment to protect the resident birds afforded him excellent opportunity to study them as well, and this book is the result of this avian association. The text is concerned primarily with Mr. Greene's own observation of the birds rather than discussion of the life history and habits of them.

Correction

In error the photographs that illustrated the article "Birds Get in Their Hair" by Paul Churcher were credited to the author. Actually these photographs were taken by Mr. and Mrs. Arthur C. Lane, whose remarkable association with birds provided the subject for the article.

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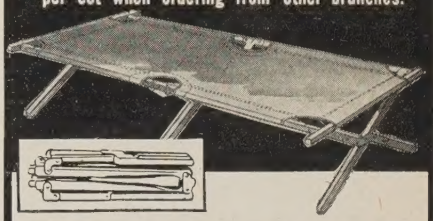
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Nature in Print

By HOWARD ZAHNISER

SPEEDING across the continent, rereading to the clickety-click rhythm of car wheels on rails the recently published books on Lake Champlain and Lake George in the northeast, on Lake Pontchartrain along the Gulf Coast, and on the Pacific mountain ranges in the far West, one is certainly impressed with the vastness and variety of the natural scene that Americans can call their own. And these are all excellent books, well written and well published.

Lake Champlain and Lake George, by Frederic S. Van de Water, and *Lake Pontchartrain*, by W. Adolphe Roberts—both edited by Milo M. Quaife—are the latest publications in the American Lakes Series, which, having already furnished us with five volumes on the Great Lakes, is now dealing with the lesser lakes, in size if not in importance in our history. *The Pacific Coast Ranges*, by a group of writers under the editorship of Roderick Peattie, is the latest publication in the American Mountain Series.

It is fair praise to say that each of these volumes maintains the high standards already established by Mr. Peattie and by Mr. Quaife.

Seldom has history been more interestingly told than it is in these lake books by Mr. Van de Water and Mr. Roberts. Mr. Van de Water's writings have an easy flow—like good conversation—and around Lake George and Lake Champlain there have been many human events that he obviously enjoys knowing about, and which he chronicles with an engaging familiarity. There is a similarity in Mr. Roberts' style, but more color. Either Louisiana has entertained in her time more colorful men and women than New York and Vermont have, or Mr. Roberts has been more attracted by the life histories of romantic characters than Mr. Van de Water has been. It has always seemed a special privilege to have within one's own country an area so exotic in all but location as Louisiana is to the United States, and one can enjoy this privilege with a special relish in reading *Lake Pontchartrain*. Whether it is Chata-Ima, the poet priest, or the fabulous Adah Isaacs Mencken from an earlier century, or the unbelievable Huey P. Long of our own time, it is indeed a romantic character that seems at least once in a lifetime to give Louisiana neighbors something to talk about. And Mr. Roberts' volume is well peopled by such characters, as well as by the less dashing makers of history. Nor, by any means, is Mr. Van de Water unaware of such reader interests, although his colors are less startling.

The lakes in these books are the subjects of interesting introductory descriptions. References throughout add to an understanding of them as geographic features. Yet primarily the lakes are the scenes for a human drama, and "the play's the thing," the lakes being just as important, but hardly more so than the stage settings. Occasionally at the theater a scene-maker's creations are so brilliant that when the curtain goes up there is a spontaneous applause—not for the characters but for the setting. Such is the response of a reader of *Lake Champlain and Lake George* and *Lake Pontchartrain*. Then, like the theater-goer, the reader is soon captivated by the drama itself, and only occasionally renews his interest in the setting.

There is, however, an entire chapter in each book in which the interests in human activities and the lakes are nearly identical, and these are, of course, those that deal with recreation. Mr. Roberts entitles his chapter simply "Sport on the Lake." With a characteristic humor Mr. Van de Water calls his "Fish and Strangers," quoting some early visitor to the effect that "the natives of this region live upon fish and strangers."

From Percy Viosca, Jr., once a consulting biologist of the State's conservation department, Mr. Roberts has gathered the information for an interesting description of the fishes of Lake Pontchartrain. He refers also to the muskrats in adjacent marshes. He describes the lake's boating, and suggests at the chapter's close that sunsets also are among the lake's recreational chapters. Making what is probably a unique disposition of a sunset description, Mr. Roberts says:

"Fishermen, hunters, yachtsmen and other enthusiasts of the outdoors have told the writer that a description of the sunsets to be enjoyed on the lake should positively be included in any book about Pontchartrain. Asked for leads, they hemmed and hawed, shrugged, and lamely mentioned mountainous clouds of all colors in the rainbow. That's the trouble with sunsets. The better they are the less they can be described. A sunset over Pontchartrain refuses to be described at all."

Mr. Van de Water describes no sunsets, either, but he shows no hesitation in description of a sort that might well handle a sunset.

"Lake George," he says, "is still a cool, bright place that presents new loveliness with each alteration of light and shade. Boathouses and the gables of buildings jut through its lakeside foliage, and, on the infrequent level spaces, green lawns run back to hotels and summer dwellings. Otherwise, the region retains its pristine fairness. The once ravaged hills that soar and swoop against the sky have been reclothed in carefully administered forests, state and privately owned. The lucid water itself is kept untainted. . . . Intrinsically the blue green depths, the heart-stirring heights, the fir-plumed islands are as they were at the beginning."

Whoever has appreciated such areas "as they were at the beginning" is most surely an almost excited reader of *The Pacific Coast Ranges*, and once again, as in earlier volumes of the American Mountain Series, the mountains themselves, and their wildlife and plantlife, are the subjects. It is true that, in deference to what he considers the lay reader's interest, we are first reading of the "rosary" of really Spanish missions that are still in California, and about "the first inhabitants." It is true, too, that there are excellent articles about the people now inhabiting these mountains, and about the literature that has been created in this region. Yet there are no city descriptions, and all that is human in the book is related to these great ranges of mountains where wildness is still common.

Judy Van der Veer in her spirited contribution on her "Foothills" says: "But the true owners of all these hills and valleys and tall mountains are the deer and the coyotes, the quail and doves and roadrunners, the brush rabbits and cottontails and

Appeal, to All Wild Animals

By ELEANOR CRANDALL

Oh, wildlings, hiding in the forest thick,
I chide you with a gentle reprimand:
Where you suspect me of some sordid trick
I have but kindness in my outstretched hand.
And, mothers everywhere who seek to use
Each tooth and claw in family's defense,
Yours is a frenzy that I can't excuse,
Since I approach you for your confidence.
Oh, woodland creature with the frightened eyes,
I hate the sound of each escaping hoof;
You have regarded me with such surprise
That it necessitates this slight reproof.
Turn to me, come to trust me in the end,
Because I am your spokesman and your friend.

jack rabbits, the kangaroo rats and field mice and pack rats, the possums and skunks and badgers, the mountain lions and bobcats and foxes, the eagles and hawks and buzzards and ravens, all the big and little singing birds, the ground squirrels and gophers, the snakes and lizards and horny toads, the little frogs that sing in damp places. . . ."

By the time the reader reaches Miss Van der Veer's assignment of these ranges to its wild creatures, Donald Culross Peattie has already described the flowers of the ranges, and Aubrey Drury has told of their wildlife. Mr. Peattie, in as charming an essay as we might expect from him, follows the blooming season northward and carries his reader through a rich chapter called "Footsteps of Spring —A Wild Flower Trail", including a notable description of the redwoods (because of the environment they create for the flowers). Aubrey Drury writes a vivid chapter, called "Glimpses of Wild Life", that is actually bustling with creatures—as dense a concentration as one ever encountered in a smooth reading essay.

And before the book has ended Lois Crisler in "The Wilderness Mountains" has shared experiences in the Olympics; Thomas Emerson Ripley has described "Timber"; Daniel E. Willard has told "The Geologic Story", and Richard Joel Russell has given the last words in "Climatic Transitions and Contrasts."

Speeding across the country toward these far western mountains one can certainly be glad to have with him *The Pacific Coast Ranges,* and if he could never hope to travel so far he would wish surely to have at least the book.

Lake Champlain and Lake George. By Frederic F. Van de Water. The American Lakes Series, edited by Milo M. Quaife. Indianapolis and New York: The Bobbs-Merrill Co. 1946. 381 pp., with 30 photographs on 22 plates, 2 text figures, 3 end-paper maps, bibliographical note, and index. $3.50.

Lake Pontchartrain. By W. Adolphe Roberts. The American Lakes Series, edited by Milo M. Quaife. Indianapolis and New York: The Bobbs-Merrill Co. 1946. 376 pp., with 34 photographs on 20 plates, 2 end-paper maps, bibliographical note, and index. $3.50.

The Pacific Coast Ranges. Edited by Roderick Peattie. The contributors: Archie Binns, John Walton Caughey, Lois Crisler, Aubrey Drury, Idwal Jones, Donald Culross Peattie, Thomas Emerson Ripley, Richard Joel Russell, Judy Van der Veer, and Daniel E. Willard. New York: The Vanguard Press. 1946. 402 pp., with 30 photographs on 17 plates, 4 full-page maps by Guy-Harold Smith, and index. $3.75.

American Birds

The Birds of North and Middle America. Part X. Commenced by the late Robert Ridgway; continued by Herbert Friedman. Washington, D. C. 1946. Smithsonian Institution. 484 pages. $1.25 from the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.

This tenth part in the descriptive catalog of the higher groups, genera, species and subspecies of birds known to occur in North America, from the Arctic lands to the Isthmus of Panama, the West Indies and other islands of the Caribbean Sea, and the Galapagos Archipelago, is of principal interest to systematic ornithologists. It covers five families: Cracidae—the curassows, guans and chachalacas; Tetraonidae—the grouse, ptarmigan, etc.; Phasianidae—the American quails, partridges and pheasants; Numididae—the guineafowls; Meleagrididae—the turkeys.

Conserving Soil

Elements of Soil Conservation. By Hugh Hammond Bennett. New York. 1947. McGraw-Hill Book Company. 406 pages. Illustrated. $3.20.

For many years Hugh Hammond Bennett has been preaching the doctrine of soil conservation, and when he became Chief of the U. S. Soil Conservation Service he was able to practice what he preached—or have it practiced—on a large scale. In 1939 McGraw-Hill brought out his large and imposing volume, *Soil Conservation,* and now, in this present book, publish a concise and less exhaustive discussion of the vital subject of our soils and how to treat them. This immediate volume is designed for use as a textbook, but it is equally valuable to the reader out of the classroom who wishes to learn the fundamentals of soil conservation as they are known today. So far as we know, this book has no counterpart in conservation literature, and is a valuable addition to it.

Gabby's Story

Gabby and the Forest Fires. By Ellen C. Dowling, with scratchboard illustrations by Ed Nofziger. Washington, D. C. 1946. The American Tree Association, 1214 16th St., N.W. Ten cents.

Gabby was a squirrel, so named for his loquaciousness. He lived on the edge of the forest. He was making out well until a fire started. This drove Gabby and his friends of field and forest away. But we are telling Miss Dowling's story, a story told to bring home forcibly to young people what happens when a fire, carelessly set, sweeps through the forest. Mr. Nofziger's illustrations are dramatic and effective, and are well complemented by the simple little text that interprets them.

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NATURE MAGAZINE is published monthly, October to May, inclusive, bimonthly, June to September, inclusive, by the American Nature Association. Entered as second-class matter May 31, 1927, at the post office at Washington, D. C., U. S. A., and accepted for mailing purposes at the special flat rate of postage provided for in the United States Postal Act of October 3, 1917, and February 28, 1925. $4 a year; foreign $4.75.

Publication and Editorial Office, 1214 16th Street, N.W., Washington 6, D. C.

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Recently we carried in our classified advertising columns a small advertisement that urged "Don't Feed Sparrows," and offered information on why not. Several readers protested that such an advertisement was inappropriate to our pages. At the same time other bird-loving readers wrote in to ask where they could get a sparrow trap to reduce the local sparrow population. We read the literature sent out by this advertiser, and while he is obviously sincere, feel that it is overdrawn and extreme, and have discontinued the ad. At the same time we feel that in many cases trapping of excessive numbers of English sparrows—alien birds like the starling and other aliens unfortunately introduced into this country—is necessary. One reader actively took up the cudgels for the sparrow, so, believing heartily in freedom of expression, we print:

THE CASE FOR THE ENGLISH SPARROW

By LETHE C. PAPE

Some years ago, my husband and I decided to establish our Lares and Penates permanently at a spot on Lake Michigan, some twenty-two miles north of Muskegon, Michigan. We had owned this home for a good many years, but had never spent a winter here, though my husband's parents had. It was through them that I became interested in the wild birds, though at the start the only species I recognized, or really thought I ever saw, were the robin and the ubiquitious English sparrow. All other species existed for me only on the colored plates of the bird books. Actually I never expected to see them. Now we feed some twelve or fifteen different kinds all winter long, not including the occasional visits of the ruffed grouse, quail and pheasant. During the spring migration, we have catalogued as many as seventy-five different birds here in our own yard, which is about 200 by 300 feet of assorted lawns, orchard and natural wooded slope.

Now this article is the case for the English sparrow, that much maligned, persecuted, drab little bird. But would he be so despised were he arrayed in the bright red of the cardinal, the orange and black of the oriole? The English sparrow may not have a great deal to recommend him. Most people will say he is quarrelsome, which I have not found him to be; dirty, which he may be, and generally a nuisance, with which I disagree. His appearance does not delight the eye, nor his song the ear, but I like him.

The first year or two that we were launched on our winter bird feeding program, we did our best to shoo the English sparrows away, and even considered such a proceeding as wiring the feeders so that we could give any English sparrow a shock if he alighted on one. I am glad to say that we didn't actually do this. We did put poisoned wheat in the feeders once, but we rushed out and took it away again before any bird, English sparrow or otherwise, could eat it.

Of course, after starting to feed the birds, we became missionaries in this field and tried to interest friends and neighbors in doing likewise, and we did make some converts, I am glad to say. Others would say, "Oh, if you put food out, you attract sparrows and they are such a nuisance." And again, when watching the birds feed here, would say, "Oh, you're feeding an awful lot of sparrows, aren't you?" I have answered, "Yes, we do feed a lot of sparrows," but I don't make excuses any more, and I am not ashamed of feeding them. Some time ago I read a book by a well-known author, in which one of the characters, a boy of twelve or so, said, "Sparrows are just as human as any other birds", in defending them.

It was after reading this that I began to examine the behavior of the English sparrow. Assuredly, he is anything but quarrelsome. I would go so far as to say he is the one perfect gentleman of the bird world, at all times, not just in the mating season. In the springtime, we see the male cardinal very solicitous of his mate, actually feeding her at the station, but in the winter he drives her away from the feeding tray, and she in turn will drive away any other female cardinal who ventures near. A chickadee, or nuthatch, or woodpecker will never suffer another of his own kind to feed with him, yet none of them mind the sparrow, who feeds in perfect amity with his own and all other kinds. I have yet to see a sparrow drive any other bird from the feeding tray.

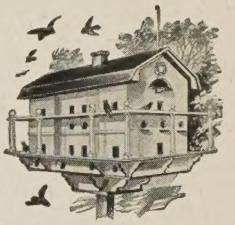
It would make me happy if all other birds were like the English sparrow in disposition, because then undoubtedly we would have the same large flocks of cardinals, nuthatches, chickadees, etc., come to our feeding stations. And would it not be a treat to see a group of twenty or thirty cardinals feeding together? However, to date, I do not believe anyone has seen the inspiring sight.

No, the English sparrow doesn't have much to recommend him, only tolerance.

Not wishing to change unduly the article above, we have presented her case as she wrote it. In justice to her and to ourselves, however, we must point to the faulty reasoning in her closing paragraphs. The various birds mentioned as suffering in comparison with the sparrow as regards disposition are, without exception, species that feed individually. These rarely find a common stock of food that permits feeding as a flock, and it might be inimical to their general economy if such stores could be furnished regularly, even in winter. It is this difference in feed- (Continued on page 217)

ATTRACT SONG BIRDS

BIRD HOUSES By Dodson



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Courtesy

Some materials for new telephone service are still scarce . . . but reasonableness, courtesy and kindness we can provide in full quantity, for we make them ourselves on the spot. "The Voice With a Smile" keeps on being one of the nice things about telephone service.

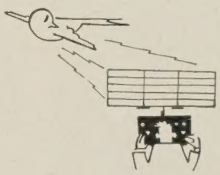
BELL TELEPHONE SYSTEM

Contents Noted

FLYING to San Antonio in one of Eastern Air Lines great, four-motored birds to attend the sessions of the North American Wildlife Conference, we could not help but note how much better our country looks from the air. There are none of the billboard and other roadside slums always seen from the automobile speeding along the highway; one cannot see the railside slums of cities, inevitably a part of any railroad journey. From seven thousand feet even the appalling erosion of many of our southern states is transformed into curious patterns, and cities and towns look neat. It is all an illusion, of course, for we know that America the Beautiful, down there, is not so beautiful after what we have done to it in the process of "civilization." Those hours of escape from the realities below, however, are one of the intangible advantages of flying, which, incidentally, we love.

"HUNTING pressure" was a phrase heard frequently at the recent Wildlife Conference, and it was usually uttered with some dismay. It should be, for the Fish and Wildlife Service reports an all-time high of 9,854,313 gunners for the fiscal year ending June 30, 1946. This is about 1,800,000 more than the previous high of 1942. Revenue from the sale of licenses brought $19,805,444 into the coffers of the 48 States. The Fish and Wildlife Service, in its release, merely presents the figures, leaving the reader to interpret what they mean to our unfortunate game animals—or to any birds and mammals, for that matter, since too many gunners shoot at anything that flies or runs. Also, the price paid for these licenses is picayunish compared to the destruction they represent, and utterly inadequate to finance any program of conservation and restoration. It seems obvious that the gunners are all set to shoot themselves right out of shooting, and, at the same time, destroy much of the wildlife to which the other 130,000,000 non-shooting Americans hold equal title.

ONE of the finalists in the Westinghouse science talent search this year is Martin Karplus of Newton, Massachusetts, our home town. Martin has a hunch that radar and infra-red rays may solve the mystery of the uncanny ability of birds to orient themselves. Anyway, he worked out his theory and entered the science talent contest. To us, however, there are even more interesting facts about Martin. Born in Vienna, he came to the United States in 1938, leaving just before Hitler took over Austria. Before long he was speaking English without an accent and skipping grades in school. He took up ornithology as a hobby three years ago, has already published papers on the subject, is a member of the American Ornithologists' Union, and is rated by Dr. Ludlow Griscom of Harvard as an outstanding field ornithologist. Martin does not plan to make birds a career, preferring medicine, but is delighted with the prospect of a trip to Washington for the Westinghouse finals, since he has always wanted to see that city. Martin thinks a stuffed bird is "a waste of a bird," preferring them on the wing. P.S. Martin won a four-year scholarship.



ONE OF the fondest memories of our youth is of after-school bike rides or Saturday hikes to a grove of chestnut trees, from which we returned with caps, pockets and shirts full of chestnuts. There was nothing quite like the flavor of our native chestnut, raw or roasted. There are no such excursions for boys today since the Asiatic chestnut blight has wiped out practically all of our chestnuts. We have long cherished the hope that our forest pathologists would find the answer and restore the native chestnut tree by developing blight-resistant forms or otherwise defeating the scourge. But word comes from the New York State College of Forestry at Syracuse University that success is still elusive. Hybrids and sprouts from disease-killed trees have yet to prove equal to carrying on the chestnut tradition. Research goes on, however, at various forest experiment stations, and, nostalgically, we wish the pathologists the best of luck.

TOGETHER with most other conservationists, we nominate for political oblivion Senator Kenneth McKellar—and the sooner the better, because it is already too late. And it is with sincere regret that we see men of such intellectual integrity as Senator White and Senator Bridges espousing, for irrational partisan reasons, the attitude of ignorance and prejudice taken in the matter of the Lilienthal appointment to the Atomic Bomb Commission by the "gentleman" from Tennessee. R. W. W.

"Not three yards from the baby was a misshapen, shaggy dog with a swollen head, red, unfocused eyes and dripping mouth. Flying to meet him was Waddles, wings outspread and neck stretched forth, ebony beak snapping and cracking like a small, angry machine gun."

Hero in Feathers

A True Easter Story

By ELLA A. DUNCAN

Illustrated by Clarence Tillenius

WHEN the doorbell rang, that Easter morning, two-year-old Susie found a small duck nestled in a basket on the front step. It was just a round, yellow ball of fluff with two black, shiny beads for eyes and a curious ebony bill that went poking about constantly into everything. It has always seemed extremely cruel to give children such small, helpless beings; too many such defenseless creatures are tortured to slow death. Surely Susie would be no exception among children. John declared emphatically that the critter would be nothing but a nuisance; it was to be taken to the pet shop the next morning.

Then came the ordeal of separating one small, unreasoning being from another. From the moment she found him, all of Susie's other Easter presents had been discarded for the tiny bit of quacking life. She was ecstatic when the duckling scrambled from his basket and waddled at her heels about the room. I tried to explain that he was just a baby duck and must go to his mother. But when I put him in a box on the back porch Susie's howls from the front porch, and the duck's clatter, rent the Easter peace. We had to relent, but, of course, only temporarily.

Surprisingly, the little girl was gentle with the soft, fragile body of the duckling. As for him, from the very beginning there was no one else in the house but Susie. When she walked he waddled at her heels; when she ran he rolled over and over like an animated yellow tumbleweed, trying to keep up with her and protesting such speed in high, hysterical quackings.

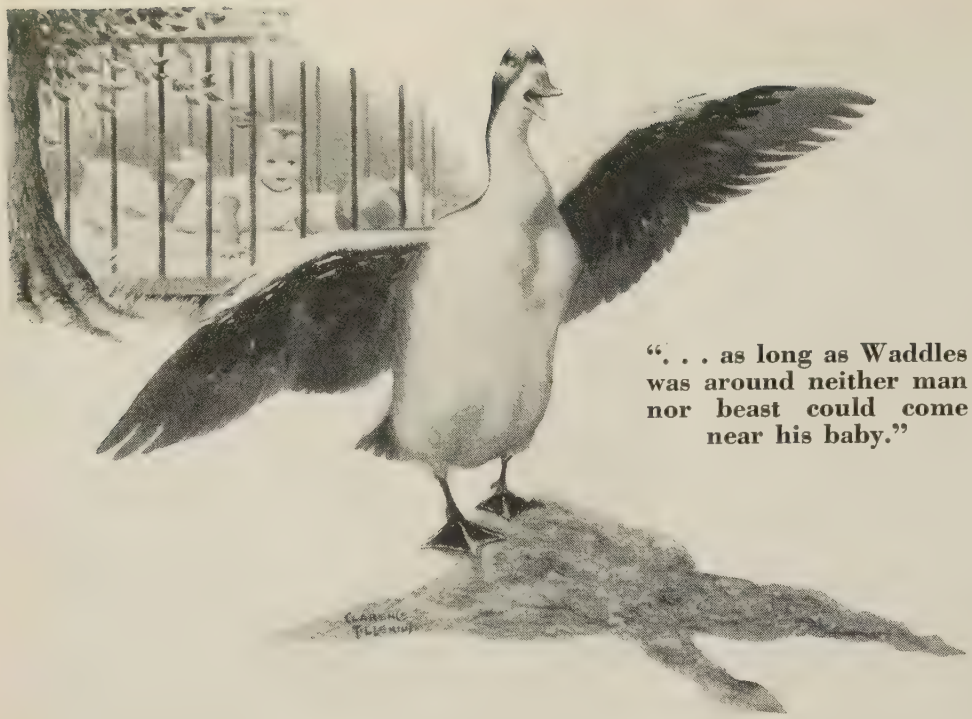
Susie spent hours, that first day, showing the birdlet her possessions. As the little girl displayed story books and blocks the small duck nestled by her side, clacking contentedly. In her eagerness to make him understand she bent her head to his level, chattering earnestly. In response, the yellow neck would stretch up and the beady eyes sparkle while the little duck talked in his own baby language. I have always thought that there is some canny or uncanny understanding between the young of the earth, something sadly impossible between adult animals. Watching the little blond girl and the baby duck that Easter morning, I was sure that there was not only a sort of spiritual blending, but a definite mutual understanding of language. There was no doubt of it in the weeks and months that followed.

Within the first hour Susie named the duck. She chose "Waddles," truly an appropriate name for an embryo hero—but I anticipate.

It was raining the next morning, so it was easy to grant Waddles a day of reprieve. I think we knew then that he would never see the inside of a pet shop. Each morning after that we made feeble excuses for not sending him, until finally John exclaimed over his coffee, "Let's keep the little cuss. It would break Susie's heart to take him away now . . . besides I sort of like him myself," he finished sheepishly.

At last Susie had a playmate—her first. There being no children her own age near us, she had been alone among adults all her short months on earth. There had been no name in Waddles' basket, so we never knew where he came from. I am sure, however, some friend much older and wiser than we must have brought him; someone who knew that everything on earth longs for something its own age, something with which to share like experiences and joys. To Susie and Waddles everything on earth was still shiny new, and wonderful beyond belief; things for exploring and exclaiming.

Together that summer in the high-fenced back yard, daughter and duck found a complete world of magic. To Ann, the maid, and to me, it was amazing how that



". . . as long as Waddles was around neither man nor beast could come near his baby."

funny little duck so quickly and completely took over what at times had been a real task for two adult human beings.

The two chased butterflies, built castles in the sandbox, played hide-and-go-seek among the shrubs and lawn furniture, or just sat in the sun and chattered about things beyond the ken of a grown-up world. There were hilarious games of their own invention, over which Susie went into spasms of laughter and Waddles quacked his glee in a voice that began to "change" as the summer wore on. His yellow down had given way to a thick coat of slate-gray feathers, marked with black. Because we knew nothing of his ancestry we had no way of knowing what his breed-line might be. He grew to be larger than most ducks, however, and was a strong, handsome fellow as he waddled proudly about the yard, head and shoulders held high.

Waddles had been with us two years when Baby Carol came, and Susie was ready for nursery school. We brought the baby home from the hospital in her bassinet, and Ann went to call the two playmates from the backyard. They stood silently, side-by-side, for a few seconds, studying the new red mite.

"Where are her teeth?" Susie wanted to know. But it was Waddles that surprised us most. Except for his various degrees of quacking he had never made any other sound. Now he suddenly beat his great wings against his sides, let out a trumpeting honk, and sat down purposefully beside the bassinet. We did not know it then, but with that wild, foreign cry Waddles was proclaiming to the world that he was at last an adult. On his shoulders had descended the grave responsibility of guard for a new, helpless being.

It was amusing, at first, to see the big duck there beside the bassinet, his neck held stiff and high, his keen black eyes darting in search of danger. Worn out from play with Susie, he had usually gone willingly to his box bed on the back porch. That night John had to pick him up and carry him—protesting and hissing—outside.

Early the next morning Waddles was at the back door, quacking urgently to be let in. After breakfast, to get rid of his infernal noise, I sent Susie out to play with him. Soon she was back. "He won't play with me any more!" she wailed.

"It's the truth," said Ann. "He just ignores her."

I was torn with sympathy for my eldest daughter in this first tragedy in life, and she was utterly bewildered by it. But, before the week was over, a little boy and a little girl, near her age, moved into the neighborhood. Then came the glorious experience of nursery school—and Susie was no longer a baby.

As for Waddles, it finally seeped through his small duck brain that the only time his guarding act was necessary was when Baby Carol was put in the back yard for her sun bath. The rest of the day he waddled majestically about the yard, muttering philosophically to himself, or sat in the sun and brooded contentedly. The only time he resembled his former animated self was when the time for the sun bath drew near. He was always at the back door waiting. If Ann or I were late getting her out, he set up a demanding clatter. In a restrained frenzy of excitement he would waddle beside the carriage until it was stopped. Then, always facing the house, he settled beneath it, every inch of his big body at strained attention.

Once more I was having reason to give thanks for Waddles as an aid to child rearing. It was impossible to teach Susie and her new-found friends to close the back gate as they should, but as long as Waddles was around neither man nor beast could come near his baby. The dogs and cats of the neighborhood soon learned to avoid that gate. Even the milkman asked if he might leave the milk at the front each morning rather than battle the big duck.

It was Waddles himself I worried about at first. I was afraid he might get out and wander off, or be run over in the street. After the second venture up the driveway to the front of the house, however, he evidently decided that the outside world held little

of interest for him. He returned to his big backyard and never again left it. It was his kingdom, and woe betide the trespasser!

It was that very vigilance, however, that nearly caused his banishment; I shudder yet to think how very near we came to disposing of him.

Because of an illness Ann had to leave us, and a new girl was employed in her place. The first morning that she took the baby outside Waddles flew at her in a veritable fury of beating wings, snapping beak and clawing web feet. Before I could come to the rescue he had ruined the girl's hose and left her legs bruised and bleeding. In shock and anger she quit. Two others followed in quick succession. It was impossible for them to avoid the backyard entirely. It was even more impossible to convince Waddles that they were to become a part of the family. Up until then he seemed to have had an uncanny instinct for doing as he should. We had never punished him, and I had no idea how to go about it now. The only solution seemed to be exile.

"The dogs and cats of the neighborhood soon learned to avoid that gate."

Then—miracles of miracles—Ann came back. All was peace in the backyard once again. I was not only thankful for that, and for her help, but a plague of rabies had broken out among the dogs of the town. Ann would guard the children as no strange girl could be expected to do, but we mothers lived in a nightmare of dread. We tried to cooperate in keeping the youngsters entertained, but it was difficult to restrain them.

One Saturday morning I had all the youngsters for a morning picnic. After the picnic Ann herded them into the house, and to get them ready for the movies. I put Baby Carol in a sunsuit and took her to the backyard for her belated nap. Making sure that the gate was closed, and Waddles settled in his usual fighting stance beneath the carriage, I went back into the house. The phone rang. A friend down the street said, "I just saw a dog turn into your driveway, and if I know a mad dog, that one is."

Every time a stray dog had been seen in the neighborhood for weeks everyone was sure it had rabies. Nevertheless prickles of fright were breaking out along my spine. Then I thought, *the back gate*—one of the children might have gone back for something! On legs that threatened to buckle, I started for the yard. Before I was halfway through the house, for the second time in his life came that high, wild honk . . . and I knew!

Screaming for Ann, I burst through the back door upon a scene that will remain with me the rest of my days. Not three yards from the baby was a misshapen, shaggy dog with a swollen head, red, unfocused eyes and dripping mouth. Flying to meet him was Waddles, wings outspread and neck stretched forth, ebony beak snapping and cracking like a small, angry machine gun. I knew that Ann was close behind me with the broom, then I lost sight of everything except the desire to gather my baby in my arms and race for safety.

Somehow I made it, with Ann and her broom as flanking support. She slammed the back door behind us and ran to call the police. Too weak and paralyzed with fear to move, I leaned against the closed door and listened to the uncanny battle outside. The blood-chilling growls and muttered barks of the mad dog told me that Waddles was doing his best, but I knew that his best was not going to be enough this time. I was too frightened to look, but from the sounds coming through the opened windows the shaggy dog and the big duck were fighting all over the backyard. Their bodies bumped and threshed against the side of the house and porch; then, except for the slapping of Waddles' big wings, the snapping of his beak and the duller sound of the dog's jaws, the fight would dim out. Waddles' first squawk of pain brought me to with the frenzied urge to do something.

"I can't just let him stay out there and fight alone when he doesn't have a chance!" I told Ann desperately.

"You certainly can't go out there and fight that mad dog barehanded. Think of the children," she declared.

There was not a gun in the house, and the police could not possibly get there in time. I prayed that Waddles would somehow realize his danger and fly up on something out of reach before it was too late. But all the time I knew he would not. His stout little heart simply would not let him stop fighting until his enemy was driven from that yard. This time, however, his opponent lacked sense enough to flee, no matter what the punishment.

The pain-filled squawks and barks gradually lessened, as did the sound of the fight, until, once again, all was quiet in the backyard. It was an ominous, deadly quiet, and through it Ann and I clung together until the police came.

There was a muffled shot in the back, then one of the officers came to the door. "I want you to see a sight you will never see again," he said.

The backyard was a shambles. Chairs had been upset. Flowers and shrubs were beaten down. Baby Carol's carriage had been overturned, and criss-crossing the sand box, that had once held so much happiness for a small blond girl and a little yellow duck, were dark red stains. In the open gateway, a wing tip touching the fence on either side, lay Waddles—his broken neck outstretched and his ebony beak turned scarlet. Just beyond him, in the driveway, lay the body of the great yellow dog.

"I don't think the bullet was necessary," said the second officer, still absent-mindedly holding his gun and looking with wonder at the mutilated head of the dog.

Somehow Waddles had managed to hold out until he drove his last enemy from the little plot of earth he held sacred and dear above all other. Some inborn instinct from his wild, dim past must have warned him that this mad invader meant death and destruction to everything he loved—and like heroes the world over he gave his life to preserve his little world and the happy way of life within it.

"In the open gateway, a wing tip touching the fence on either side, lay Waddles . . ."

There were no medals or citations for Waddles—only a small grave in the corner of the yard he loved so well, and the deep, undying devotion in the human hearts that knew him.

★

Survival

By MARGARET STOCKWELL TALBERT

And still, there are these brilliant, unfurled wings
to tilt against a pale November sky.
What simple poignance of belated things,
so fruitlessly to flutter, and to fly,
within a world grown chill.
And did the creature's very cells descry
with joy, the smoky-yellow flower?
. . . . dulled and diminished, and alone,
yet potent to fulfill,
again, its part in pattern: sign of resistant power
of fruitful earth—eternal and undying, and not yet asleep.
Frangible, doomed insect, vainly flying, and shrinking
drying weed:
and both are charged with single, certain purpose—
faithfully to keep
each form of life alive. The drifting, blown seed,
so far to be dispersed, makes the stark
wraith of golden-rod immortal. Dark
winter will engulf the aerial insect; deface,
and bring to nothingness, the bright impermanent wing.
Upon a morning furred with frost, an egg-case
will be firmly bound upon bare stem:
impermeable, to shed sharp rain and snow—
to be; to wait; some day, to move, to grow.
The sweeping wind will come; the snapping cold;
each seed, each egg, unconquerable will hold
its priceless, formless jewel, close enwrapped
. . . . . and Spring unfold.

By RAYMOND TIFFT FULLER

Precision-Homing

Over five thousand miles of sea and land the hummingbird returned to build its fragile cup ten inches from the site of a year ago.

TO HIT an enemy target by precision-bombing through layers of clouds from heights up to, say, 30,000 feet, was an extraordinary attainment of wartime. Precision-*homing* is a matter of millenniums. Consider certain carefully studied birds; certain insects. By the possession of equipment we do not even understand, they, too, can perform operational miracles, such as keeping a rigidly straight course along a compass-line—without a compass and without a gyroscope—finding the way back across trackless water to a land point, perchance where they had been first captured and transported; migrating "home" again in spring by a route differing from the one they emigrated along months before; doing all this without a companion, a guide, a timetable, a landmark, even sometimes without food. Impressive mysteries these—brought into focus, controlled, studied, mainly through bird-banding.

One July I caught up a three-weeks-old, half-fledged infant scarlet tanager from the twig perch near the ground. It had been piping and piping there for an hour before we could finally locate it, and I put it into one of the four "cells" of a Potter bird-trap. Within five minutes green-and-black mother, appearing from nowhere, dropped down to give her hungry offspring a beetle. Of course she hopped into the cell next to his and down came the door. Her right leg wore a band, the band I had put on it exactly twelve months before—and not fifty feet from this very spot. Since I affixed that aluminum, numbered band, she had flown to, say, Venezuela, and back. Back where? To New York State? To Sullivan County? No, to my two-acre lawn. There is precision-homing for you! Six thousand miles or more, and she had "hit it right on the nose," as the flyers say.

Incidentally, there is more to this occurrence than just spot-homing. The lady tanager is not generally supposed to choose her annual nesting site; that is for the male, who, as bird-men tell you, arrives north a week or more earlier than she and selects a satisfactory location, and thereupon begins announcing by song and defending by might that spot. Presently a female happens by, is charmed, pauses, capitulates, and proceeds to build a nest. But here *she* was, a second summer, at least. Do tanagers keep together, mated, for more than a season? Not likely, for he precedes her, and chances are, of course, they never did stay together in the tropics in autumn. And would they recognize one another now, and heartily embrace, after such a separation—even if they did chance to meet? Then, did *she* do the site-choosing and inveigle a male to come—first year—both years? I did band her mate of the previous year; I wish I could have trapped the second season's mate, too! Maybe that would have proved something or other. But the fact that she came back to my lawn proves something—precision.

Banding is not absolutely necessary to prove some of these homing miracles. I recall that for three successive springs—arriving almost always on the dot of May 5—a male Baltimore oriole came back to my elms. The reason I recognized him (I never could lure him into a trap) was that his commonest song—on some days tirelessly reiterated—was a most cheerful and chummy admonition: "*Don't be rid-i-cul-ous, pleeeeese!*" The fourth summer we heard him no more. His successor was always singing: "*Look here, look here, I'm bright yellow.*" And *he* returned a second May, I know, because he said so. These orioles winter far beyond the Rio Grande, but they never forget a dooryard! At almost the same period there came each March into these mountain foothills a song sparrow. For three years, also, what he sang most often—for of course, being a song sparrow, he had a wide vocabulary—was, "*Here, here, here's Mr. L-e-e-e-vy, Sir.*" No mistaking that voice and his exact rendition of those syllables every day for two months

or more. At length, I suppose, he became full of years, died, and went to his fathers—just as accurately as he found my brook every spring.

There are other precision-homers around my place. One is a robin who is never satisfied enough with the Carolinas or Georgia to stay there after February. Back he comes, bringing his band—leg-band, I mean, —to my porch just as early as snow allows. His round trip is only a meager 2000 miles, I judge.

A hundred rods from the house is a line of evenly spaced sugar maples, bordering one side of our dirt road. They are young at 150 years, launching seeds by the million every third season as if still in a lusty prime—as, indeed, they are. One June morning I was sauntering beneath the row, admiring them, loving them. Presently I approached a tree, notable among the rest a year ago because it held the latest hummingbird's nest I had found. I wondered whether that lilliputian structure could have survived the blasts of winter. It had! There clung the remains of the tiny felt cup that I had happened upon just twelve months before to a day. I walked a few paces aside to get a different angle. I stared. No doubt of it, there was a second nest, a *new one*, on that same sloping maple branch ten feet over the roadbed! After twelve months, here, about ten inches farther up that branch, was this new nest, as lovely as the first. Same tree, same branch, same week. Was it made by the same builder? It must have been; the choice of this particular spot by another bird could not be *quite* so mathematically magic a coincidence! She had so favored this location, had the builder, that she used it twice! In my youth I had found, on several occasions, instances where other species had refurbished an old nest, or built close to one of its own a year old, but never a hummer. I believe this find to be unique—at least, in so-called bird literature. Should you be skeptical about the phenomenon, I point out that of the *first* three ruby-throats ever banded and caught the succeeding year, all three did come back to the honeysuckle vines of the very person who placed the bands on them. That fact *is* in "the literature," in a pamphlet published by the old U. S. Biological Survey. What a memory, what resolution, what stamina, what superhuman sense of direction and "homing" guided this ounce of bird life; first down south across a dozen states, the Gulf and Yucatan, to Central America; then northward in spring over the route to this very place of mine, to this very maple tree! Consider one leg of that journey (made both coming and going), the flight straight across the open waters of the Gulf of Mexico. This tiniest of birds can accomplish *that*—without rest, without a chance to eat! Now here they are again, back among my aged maples—*to hit a tree* at 5000 miles! I did not say 5000 feet!

★

Preview

By ULRICH TROUBETZKOY

So early, early, you can coax
  a vase of apple twigs to bloom,
illusion of an orchard tree
  in the false springtime of your room.

More actual than this, the wasp
  who slowly climbs the window pane,
the pussywillows crawling out,
  the smell of thawing earth and rain.

The skunk is snuffling near his hole,
  the woodchuck waddles from his den,
and lean bears leave their hollow trees
  to stalk the living woods again.

The chickadees have a new song,
  blacksnakes stretch on the pasture wall,
stone-warmed, and any day you'll hear
  the bobolink and robin call.

Jacks-in-the-Pulpit gently preach
  green sermons to the waking marsh,
in spite of peeper's heckling noise
  and screaming grackles, shrill and harsh.

Look for arbutus on a slope
  where broken webs of snow have clung
and in fern-shadow by the brook
  you'll find the yellow adder's tongue.

"The Pilgrim's Sycamore"

By B. L. GOETSCH

TEN miles south of Cleveland, Ohio, on Riverview Road, stands an ancient sycamore tree, or, rather, what is left of it. This venerable monarch of the virgin forests of Ohio is estimated to be considerably more than five hundred years old. Its circumference is twenty-one feet at five feet above the ground. Many years ago the Western Reserve Chapter of the Daughters of the American Revolution placed a memorial plaque at this historic tree. Since some of the old records of this organization are lost, it is not known when this was done. This much, however, seems certain: it was placed there longer ago than within the memory of anyone now living. Albert W. Kelly, of Lakewood, Ohio, was able to give the inscription that was on the now vanished plaque, for he copied it many years ago when the words were already so dimmed with age that he had difficulty in deciphering them, even with a reading glass.

This much Mr. Kelly was able to copy:

"THE PILGRIM'S SYCAMORE"

"Columbus might have seen this tree. In 1786 this tree sheltered Moravian missionaries while Indians were disembarking from canoes on near-by Cuyahoga River. They established the village of 'Pilger-Ruh' on the site of an old Ottawa Indian town on the plateau above Dunham Road."

"PROTECT THIS TREE."

It was the Moravian missionary David Zeisberger, with a remnant of the exiled Christian Indians, originally from Gnadenhütten in the valley of the Tuscarawas, who came here after years of wandering and hardship and danger and called this place "Pilgrim's Rest." It was for this group, and their leader, that this "Pilgrim's Sycamore" was memorialized by the Daughters of the American Revolution.

Mr. Kelly gives a description of this tree when it was in its prime. As he recalls, when ice skating on Tinker's Creek, which flows near this tree, it was about one hundred feet in height, its huge tortuous branches themselves as large as trees. As long as he can remember, the tree has had the same enormous girth as today. Evidently it has not expanded its waistline since Mr. Kelly's boyhood days more than fifty years ago.

Instead of having enjoyed perpetual protection—as the D.A.R. ladies hoped—its limbs were shorn off and its crown blasted out with dynamite some years ago. The reason given was that the tree was insecure. All that remains of this old giant is the huge trunk about twenty-five feet high. From the wrecked top

"The Pilgrim's Sycamore" photographed in 1938 before the old D.A.R. plaque vanished. The legend was by then virtually illegible and has been replaced by a sign by way of rededication to posterity.

have grown a new crop of branches and twigs, adding several feet to its height. The leaves on this new growth were so large last summer that two average-sized outstretched hands did not nearly cover one of the big, broad leaves we brought home.

During 1946 this tree was among 150 native forest trees chosen in Cuyahoga County by the Moses Cleaveland Sesquicentennial Committee to be honored with a marker. Dr. Arthur B. Williams, Curator of the Museum of Natural History, Cleveland, Ohio, was the chairman of this committee. The marker has the following words:

"Sycamore. Platanus occidentalis.
This is a Moses Cleaveland Tree. It was standing here as a part of the original forest when Moses Cleaveland landed at the mouth of the Cuyahoga River July 22nd, 1796. Let us preserve it as a living memorial to the first settlers of the Western Reserve."
Sesquicentennial Committee."

A few weeks later we found another "plaque" (?) *nailed* to the trunk of this hapless forest patriarch. This one had an inscription, too. Just two words—"FOR SALE." We came away, anxious for the safety of the historic tree. However, now we feel reasonably sure that it will be saved for those who wish to see a survivor of the primeval forest.

Pop Wren arrives before his mate, and has the home site selected and the nest built by the time she puts in an appearance. However, the nest never suits her, so she tosses it out the front door of the nest box, rebuilding it with much of the same material she has discarded.

Wrens Around the Place

By J. ALDEN LORING

Photographs by the author

HOUSE wrens are distributed in the summer throughout eastern North America as far north at least as Manitoba, Montreal and Maine, and winter from South Carolina southward. The nest may be placed in a bird house or a cavity in a tree. It is composed of twigs, or other coarse materials, and is lined with feathers or horsehair. The eggs, six to eight in number, are vinaceous colored and minutely speckled, generally with a wreath of a deeper shade at the large end. Two broods are reared in a season. After they leave the nest the birds linger about for a few days, then disappear.

At Owego, Tioga County, in southern central New York, the male of a pair of wrens that visited me for several springs arrived between the third and sixth of May, about ten days in advance of the female.

Wrens are the most cranky and energetic of birds. Upon arriving the male wastes no time but starts right away to remove the lining of the nest used the year before, for the birds will occupy the same house season after season. By the time Pop Wren's wife arrives the nest is completed, but never to her satisfaction. Between periods of scolding him, she throws the twigs out of the "front door," while he, perched near by, outstretched wings quivering, pleads in vain with her to desist. After completing the destruction, she rebuilds the nest, using much of the material previously discarded. This was the routine procedure every spring with the wren guests that chose to live in my bird houses.

While the female is incubating, the male puts in his time building fake nests in every cavity and birdhouse he can find. This trait is also common to marsh wrens. They build a globular nest, with an entrance in one side, placing it among the rushes and cattails in marshes and swamps.

By the strategy of placing numbered aluminum bands on their legs, it has been found that house wrens often swap mates during the nesting season. While house wrens have the reputation of destroying the nests of other small birds, my wrens lived in perfect harmony with pairs of chipping sparrows, song sparrows and yellow warblers that had nests within twenty-five feet of their house.

A wren that visited me year after year was very tame, not only with me but with all members of the family. The morning he arrived, as soon as he heard my mother open the kitchen door, he flew right in for his worm. And he kept it up every day until he went south. He spent much of his time in and out of the house examining room after room, and then flying out by the front door. Once his inquisitiveness got him into a can of green paint, and then I had the delicate task of cleaning his wings with kerosene.

Indeed, it is always interesting, and often exciting, to have wrens as welcome guests around the place.

A Spring That Breathes

By KEITH BARRETTE

The "breathing" spring flowing with clear, cold water. During the dry season it flows for 18 to 20 minutes, then ceases entirely for a like period of time.

THERE are many kinds of springs—hot ones, cold ones, mineral springs. Seven miles east of Afton, in western Wyoming, there is a spring that breathes.

This is neither flight nor fancy, because the intermittent flow of this spring is accompanied by a definite exhaling and inhaling of air. During the high water season, in spring and early summer, this natural phenomenon can be observed only by watching closely the rise and fall of the flow, measuring it against the water marks on the rocks. But as July blazes into August, and August swings toward autumn, the sporadic action of the spring is visibly apparent. Then it flows for from eighteen to twenty minutes, and then ceases entirely for a like period.

As the water vanishes into the crevices, and beneath the stones of the spring's gaping orifice, which yawns from the face of a sheer, perpendicular cliff, it is attended by a loud sucking sound of rushing air. It is as though some giant within the earth was inhaling a mighty breath. At the end of the dry period, when the water again bubbles out of its underground fount, the spring exhales with a gigantic, prolonged sigh.

What makes the spring start and stop? No one knows, for certain. There appears to have been no official geological investigation and no authoritative explanation advanced. The most logical reason seems to lie in the siphon theory. Probably this surface water comes from a subterranean cistern fed by underground springs. When the water reaches a certain level, it starts to flow through an airtight passageway in solid rock. The water continues to siphon out until the level drops to a point permitting air to enter the tube. Then the flow ceases until the springs replenish the reservoir to its high level again, and the procedure is repeated. During the heavy run-off season, this period of replenishment is so brief that the flow never entirely stops.

The only other similar springs reported are two small ones. One of these is in New Zealand and the

Visitors to the spring stand in its dry course during one of its "rest" periods. The spring holds its mystery and one can only guess why it acts so.

other in Yugoslavia. The latter is claimed to have a flow of twenty-four cubic inches of water per second, while that of the Wyoming spring is estimated at 1250 inches per minute.

The water is extremely cold the year around. One cannot hold his hand in the current for very long before it begins to grow numb. The torrent spills in a white flood over green, moss-covered rocks some 300 yards down the mountainside to form the course of Swift Creek.

Archibald Gardner, one of the early settlers of the region, is credited with discovering this natural phenomenon about forty years ago. However, he never lived to see the actual performance of the spring. Gardner operated a saw and flour mill at the mouth of the canyon down which Swift Creek races. He noticed that his mill pond visibly fluctuated and called the attention of his four sons to the oddity. While floating logs down the stream, the curiosity of the brothers got the better of them, and they went up the canyon to investigate. This investigation resulted in discovery of the spring and its strange behavior.

Strange to say, the spring is known to but few people other than the residents of Star Valley, and many of these know of the phenomenon but have never witnessed it. This is partly due to the almost inaccessible location of the spring. One may drive a car to within three and one-half miles of it, but the remainder of the way must be made either by horseback or on foot. This is along a Forest Service trail that struggles up the canyon on the bank of the stream. It is a rough trail, partly rocky and steep. It pushes through bushy entanglements, but is brightened by patches of Indian paint brush, wild columbine and sego lily.

The spring that breathes, besides possessing interesting scientific features, has economic aspects as well. It affects the daily lives of practically every resident in Star Valley and makes its influence felt on their welfare, because its waters drive two hydroelectric plants, supply the culinary water to Afton, and irrigation water for a large portion of the valley.

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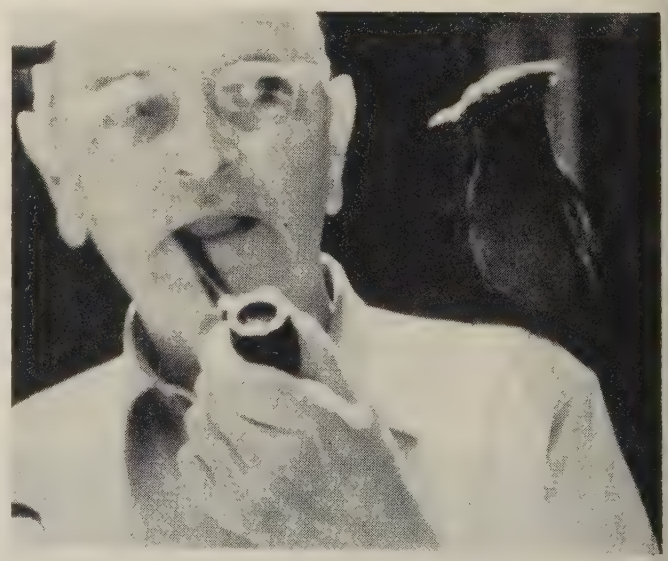
An Affable Jay

By HOWE WILLIAMS

BUTCH is a crested jay who lives in more or less disharmony with a flock of his relations at Camp Curry, Yosemite National Park. It was his irresistible greed for peanuts in the shell that overcame his timidity and beguiled him into an amicable and fearless intimacy. Some grosbeaks and jays will snatch a nut and be gone like a pickpocket, but Butch tagged after me, perched on my shoulder and bared head, posing for camera shots by amateur photographers. The approach to this intimacy required a week or so of gentle persuasion, and a pound sack of nuts.

Rewarded with a nut, the jay would sink it in his gullet, to be regurgitated later, and ask for another. Although I told him he would choke himself, he would sit on my knee until he got what he wanted; then fly off a short distance, kick a depression in the dirt, deposit the nuts, cover them with pine needles and dirt, and place a twig over the spot for identification—sometimes two sticks laid crosswise.

In the early morning, as I lay in my cot beside the window, Butch would appear on the sill, hop on my stomach and eye me—sarcastically, I thought, for not being up on such a lovely morning. One morning he flew over to the washstand, in the lower drawer of which was the bag of peanuts. He knew very well where they were secreted. With a squawk of displeasure because the drawer was shut, Butch flew to the bureau and expressed his resentment by tossing to the floor paint brushes, a box of matches and my



wife's girdle—which did not belong there anyway. Then he parked himself on the rafter, preening his feathers while his timid wife sat on the window ledge peeking in.

We got very sentimental over Butch. My wife thinks he loved us. When you touch the heart of a cantankerous jay you feel as though you had converted him to Christianity—with the reciprocal byproduct of a mutual affection.

When we vacated the cabin, leaving as a farewell love-token a string of peanuts on the sill, a somber thought struck both of us—would the next occupant be kind and understanding when Butch makes his morning call? Or will Butch encounter some inhuman creature who may even chase him out of the place because he is not housebroken? The thought still troubles us but we hope Butch's personality prevailed.

Henslow's Sparrow

Dweller in the Tall Grass

By ROBERT LEO SMITH

Illustrated by the Author

In 1820 John James Audubon, while searching for birds "opposite Cincinnati in the state of Kentucky," discovered, "on the ground, amongst tall grass," a short-tailed little bird with a striped, olive-colored head, black-streaked underparts and russet wings. "Perceiving it to be different from any which I had seen," he wrote in this very first account of this bird, "I immediately shot it, and the same day made an accurate drawing of it." He named his find Henslow's bunting, in honor of his kind and generous friend, John Stevens Henslow, Professor of Botany in the University of Cambridge.

From the year of his discovery on, Henslow's sparrow has flown erratically through the pages of American ornithological history. Because few have observed him, our knowledge of him has increased slowly and sporadically. So retiring is this bird, so inconspicuous a song does it sing, that it is seldom noticed by anyone except skilled bird watchers, and even they are likely to overlook it.

In the low, damp meadows where the grass grows rank and tall, you will find Henslow's sparrow, and on grassy hillsides where springs ooze through the ground. This habitat is shared with the Savannah and grasshopper sparrows, the bobolinks and meadowlarks. This sparrow comes during late April, when the apple trees are pink with bloom. He passes most of his time on the ground, and is exceedingly difficult to flush from the dense, tangled vegetation. When pursued, he runs mouse-like through the grass, as if reluctant to fly, or squats, hidden, among the weed stalks. Only when a bird is too closely pressed will it take suddenly to undulating and erratic flight, a flight the first few seconds of which are characterized by a peculiar twisting of the rump and tail, as if the bird were adjusting itself to a flying position.

In the days of Audubon the all-grass habitat of Henslow's sparrow was limited, for most of the land within this bird's range was heavily forested. Then this species was found in the salt meadows of New Jersey; in the marshes along rivers and lakes; in the grassy openings of the forest, and in the prairie regions of the Middle West. With the clearing of the forest and the increase of meadows and hayland, the Henslow's sparrows spread to new regions; but with the plowing of the prairie they disappeared from many parts of the Middle West. Today they breed in the Alleghanian and Carolinian faunas from the Great Plains to the Atlantic Coast, being most abundant in the landward edges of the New Jersey and Maryland coastal marshes.

So local are the preferences of this sparrow that nowhere in their wide range does it occur extensively. Instead, it nests in small scattered colonies; present in some areas, absent from others just as suitable. And if the tall grass is destroyed by burning, by mowing, or by plowing, they inevitably disappear.

I first discovered Henslow's sparrow in west-central Pennsylvania on the evening of May 8, 1943. While watching and listening to the grasshopper and Savannah sparrows on the hillside of our farm, I heard, in the field to the west of me, the queer, monotonous notes of a Henslow's sparrow. Leaving the hillside, I walked across the highway, down through a small field of wire-grass and goldenrod, past the little pond where I watch the migrant solitary sandpipers, and into a boggy field grown up with tall grasses. There I found my bird perched atop a fence-post, singing vigorously.

This *was* a find, for the Henslow's sparrow occurs in only two widely separated Pennsylvania localities: in the extreme northern corner of Huntingdon county, some eighty miles southeast of my home, and in scattered areas in Erie, Crawford, and Mercer counties, some one hundred miles to the northwest, where boggy areas to its liking are rather common.

As June of the same year ended two birds were present, only one of which sang. Their actions indicated they were nesting for they chipped at me with alarm when I approached their territory, and they re-

mained in that one section of the field the whole season.

May 2 of the following year yielded two of these birds in a boggy meadow on the northern boundary of our farm. In my notes I wrote: "All day I heard them utter their weak *tsilick*. At twilight they were rather difficult to find, as they persisted in running mouse-like through the grass. But a pair finally came out into some sparse growth to feed and here I could see them well. They did not remain together long, the one flying off toward the swale, the other remaining. He refused to sing in my presence, confining himself to uttering thin *tsips*."

April 13, 1945, was hot and sultry, unseasonably warm for the month. The grass already was thick and deep, and the leaves were out as in May. I heard, to the south of me, the slight song of Henslow's sparrow. At first I thought I was hearing things; then it came again—*tsilick*. Finally I found the singer perched on an old weed stalk. *Tsilick*, he sang, as if he were reassuring me that he had arrived a full two weeks ahead of the earliest known spring record for this species in western Pennsylvania. A few minutes afterwards I heard another, several hundred feet beyond.

The Henslow's sparrow throws back its head, opens wide its large, pale-colored bill and coughs out its almost liquid song as if it were sticking in its throat.

In spite of the March-like weather that followed, all the birds remained, and even sang throughout the cold, wet days. By late June I had discovered thirteen pairs of these sparrows breeding in three colonies. Thus Henslow's sparrow was no longer a bird for occasional delight only, for in three years he became common about my home, and his quaint, brief song became as much a part of the field music as the ecstatic flight song of the bobolink and the simple lay of the meadowlark.

The song of this sparrow is scarcely a song at all; it is little more than two notes jerked out of his throat. Perched atop a weed stalk, or a tall grass stem, he throws back his head, opens wide his large, pale-colored bill and coughs out his almost liquid song as if it were sticking in his throat—*Tsilick . . . tsilick*. All evening long he sings that quaint little ditty over and over, as if continually practicing his song with hope that some day he might improve it. Few birds sing with so much effort yet achieve such poor results.

Jouy, who in 1880 observed the Henslow's sparrow in Virginia, ascribed to this species a song that belongs to the grasshopper sparrow. "Besides the characteristic note of *tee-wick*," he wrote, "they have quite a song, which may be fairly represented by the syllables *sis-r-r-rit-srit-srit*, with the accent on the first and last parts. This song is often uttered while the bird takes a short flight upward; it then drops down again into the tangled weeds and grasses where it is almost impossible to follow it." This song he described undoubtedly is the "bubbling," or mating song, of the grasshopper sparrow. Not only do the syllables suggest the tonal quality and the spirit of the mating song, but the habit of singing it in flight coincides with the behavior of this bird. I have observed both species many hours in our fields, and elsewhere where both birds sing and breed, and I have never heard the Henslow's singing a song that even suggests the mating song of the grasshopper sparrow.

Although he is heard throughout the day, the Henslow's sparrow sings most persistently in the gray light of dawn and the mellow light of evening. He likes, it seems, to sing when the light is low, and the air and grass are damp with dew or rain. On rainy days, when most birds are silent, the Henslow's sings incessantly, even when the rain is pouring down. Among our diurnal birds he is the most persistent night singer, singing late into the darkness, at times the whole night through. What he lacks in melody he makes up in persistence.

The territorial and courtship habits of the Henslow's sparrow are rarely observed, for these activities take place in the jungle of the grass. Shortly after he arrives at his nesting ground, the male stakes out his claim to a certain segment of a field, a segment that may range from one-half to several acres in extent. He proclaims his ownership by mounting a tall weed stalk and coughing out *tsilick*. For hours two males will duel with song, each answering the other emphatically, but I have never seen a Henslow's sparrow engage in a territorial fight. Either the fighting takes place entirely down deep in the grass, or it does not occur at all. Perhaps, due to the semi-colonial habits of this species, the males are more or less tolerant of one another. But on those occasions when an unmated male endeavors to steal another male's mate, the two birds will fight much like domestic cocks, a battle in which the intruder always is defeated.

Upon the arrival of a mate, the Henslow's singing decreases but does not cease until nest building begins. As the male, perched on his singing post, watches over his territory and sings an occasional song, he hears rising out of the grass the mating call of the female—a series of intense, high-pitched, sibilant whistles, diminishing as they descend the scale. Presently he flies to the ground and there picks up a bit of dried grass. For a few moments he hops around with it in his beak; then he drops it and sings feebly. Soon both of them flit above the grass for an instant, then drop back into the vegetation, all the while both of them uttering the mating call. At times the male, on fluttering wings, leads the female through the grass, as if seeking a nesting site. Then, or shortly after, when the female begins to carry nesting material, the mating occurs.

In the last days of May or in early June the Henslow's sparrow builds its nest, but if the first nest is destroyed it may build as late as August. The nest, which is built by the female alone, is made of dried grasses, and is usually placed close to the ground. Later in the season, when the vegetation is thick and grown, the nest may be built six to twelve inches above the ground and fastened to the stiff stems of grass. Those nests that are built close to the ground are artfully concealed at the bases of thick clumps of grass, the base of the deep-cupped nest being nearly three inches above the level of the earth. The nests are domed like those of the grasshopper sparrow, making them almost invisible from above.

After she has completed the nest, the female lays, each day, a dainty, greenish-white egg, lightly speckled with rufous brown, until she completes the clutch of four or five. Unaided by the male, she incubates them for ten or eleven days. Since she sits closely, she does not flush from her nest until almost trampled upon. Seldom does she fly up directly from her nest when danger approaches; rather she slips quietly off and runs nimbly through the grass before taking flight. She never goes to the nest directly, but alights in the grass some distance away and scurries to it on foot.

While his mate incubates the eggs, the male spends his time singing and defending his territory from all intruders. Before the courtship was completed, the male was tame and allowed you to approach him closely. But now he eyes you nervously. Standing on his perch, head lowered between his shoulders, he jerks his whole body as if reluctant to leave, uttering again and again a sharp *tsip*. Then, as you come nearer, either he will dart off in undulating flight, or drop down from his perch into the grass, suddenly reappearing to chip in alarm from another weed-stalk not far away.

On the day the eggs are hatching, the female—according to Hyde, who made a study of this species—leaves her nest and mounts up some twelve feet in flight and utters animated twitterings, seemingly signaling her mate to come to the nest. From this day on the male takes an active interest in the family. He almost ceases singing. He becomes highly alarmed at human and animal intruders. And he and his mate search tirelessly for caterpillars and crickets, grasshoppers and katydids, to feed the young.

By the sixth day the young are nearly feathered, and by the tenth they have left the nest. For nearly twenty days after, they are cared for by their parents. But during this time they learn to acquire their own food and to shift for themselves. Their parents still give the alarm note at the approach of an enemy, but the young must be alert for marsh hawks, skunks, and snakes. When they have reached the age when they can care for themselves, they leave their parents and wander about from field to field.

The young Henslow's sparrows, like their parents, are masters at the art of escaping detection. They are difficult to flush. Instead of trusting their newly acquired powers of flight, they prefer to run quietly through the grass, with which they blend, or squat motionless at the base of a grass clump.

It is late August. The meadows, aflame with yellow goldenrod, shimmer in the heat. The birds of the field are silent. Only the incessant chirrups of the field crickets are punctuated by the long-drawn stridulations of the grasshoppers. The Henslow's sparrows, moulting and silent since mid-August, skulk in the grass and feed on the abundant insects, and the seeds of weeds and grasses. Throughout September they remain, seldom seen and never heard. Then come the chill, crisp nights and killing frosts. The sumac leaves blaze red and hickories turn bronze, and the Henslow's sparrows leave more silently than they came for the open, grassy pine woods of northern Florida.

During his winter sojourn in the southern pine flats, this sparrow behaves much the same as he did a few months ago in the drowsy, late summer fields of his breeding grounds. Silent and unseen, his presence scarcely known, he forages in the wire-grass that grows beneath the scattered (Continued on page 218)

The Case for Spring

By PAUL H. OEHSER

Spring never needs to bow
To rhyming or to reason,
Nor deviate to show
Supremacy of season:
With wanton disregard
For precedent and science,
She skips around the yard
In shining self-reliance;
Or in a milder mood,
Dependent on her choice,
She tiptoes through the wood
Without a breath of noise,
Where, in the dead of night,
She touches every bud,
But keeps her secret tight—
Hers is a sovereign blood . . .
Holding her proud head high,
Waving her private banners,
Spring need not justify
Her magic of her manners.

Goldfinches in Saskatchewan

By H. H. PITTMAN

Photographs copyrighted by the Author

AMERICAN goldfinches, or "wild canaries," are about the last of the Saskatchewan birds to build. When practically all the single-brooded small birds are through, and the others are engaged with a second family, the goldfinches are only starting. All summer they lead a happy, carefree life, poking gentle fun at their friends and neighbors who early assumed domestic responsibilities, but shirking such labor themselves. To them nest-building is quite an afterthought. Not until the middle of July in Saskatchewan does the idea seem to occur to them, and even then it is carried out in a detached and hurried manner.

While superficially surprising, this delay has its advantages, not the least of which is the fact that they escape the attention of the crows, who earlier in the season live largely upon eggs. Then, too, the food needed by the chicks is most abundant. Although goldfinches are common enough in Saskatchewan, their nests are not often seen. For a long time I supposed, from their casual behavior in summer, that many remained bachelors for one reason or another. However, much of this seeming indifference is a habit of the species, and, incidentally, a most misleading one. The nests are rather hard to find, too, and, although we may know the kind of sites preferred, the birds are erratic in their choice.

One July 29 I found a nest, twelve feet from the ground, with four eggs in it. Climbing the slender tree being out of the question, we built a platform with a hiding-tent on top, moving it a little closer every day until it was right beside the tree. On August 5 I found another nest containing four newly hatched chicks, and about five feet from the ground, so I put a hiding-tent beside this one also. Both nests were so placed that photography was possible only for an hour or two in the early morning.

The mothers hatched the eggs without assistance, and continued to sit and cover the chicks. Neither of the brilliant males was ever seen to attempt to share this work. The females were on their nests practically all the time, and sat closely throughout two storms in which the winds attained almost cyclonic velocity. The male birds provided all the food, giving it directly to the chicks on the few occasions when their partners were absent, but generally passing it to the females, who showed their appreciation with quivering wings. Each female knew the voice of her mate and ignored the calls of passing birds, although I was unable to distinguish one male from another.

The mother goldfinch perches high on a nest that is full of young birds that soon will be fledged. Nests of these birds vary widely in size and in the material used in building them.

The males never carried food in their beaks and apparently gave the hens partly digested food from their own crops. This accounted for the long inter-

A pair of goldfinches. The mother bird has just fed the chick with food passed to her by her mate, and both are watching the young settled down contentedly in the nest.

vals between their visits, which averaged thirty-five or forty minutes. Spending only a few minutes in every hour at their nests, and so long at their feeding-places, would lead a casual observer to believe the birds are bachelors. Although the females appeared to swallow the food brought to them, they passed it to the chicks later on, but often only after a considerable interval, for young goldfinches are not fed so frequently as the chicks of other small birds.

Goldfinch nests vary surprisingly, both in material and size. I have seen a large structure high up in a poplar built entirely of vegetable down, untidy but wonderfully concealed. A small nest in a Manitoba maple was built of fine fibers, including some seed-heads of grass and several pieces of string. It had a lining of sheep's wool, and was as neat and trim as the best type of yellow warbler nests. There seems to be a tendency to make the bottom of the nest thicker than most small birds consider necessary, but this is not always the case. However different the nests may be, their position is always approximately the same—where a group of branches join a main stem.

While the chicks of some of our prairie birds may experience late spring frosts, young goldfinches sometimes have to endure the early autumn ones. The birds I had under observation left their homes on August 13 and August 17, respectively, and during a period in which frosty nights sometimes occur. When the last nest was empty, I found a cowbird's egg embedded in the bottom. Goldfinches are not good housekeepers, and an empty nest is invariably covered with the dried excrement of the young birds. This is so noticeable that it makes identification of a goldfinch nest easy.

Although so wise in many ways, goldfinches are easily decoyed, more readily perhaps than most of our small birds. For some years in southern Saskatchewan, I kept an injured female, and it was not unusual to find seven or eight male birds around when the cage was hung out in the garden.

On the prairie, goldfinches feed largely on the seeds of dandelions and thistles, or, when these are not plentiful, on the seeds of gaillardias and similar plants, often returning to a particular head until it is completely denuded. It is these seeds, crushed and partly digested, that are fed to the chicks instead of the insect diet that so many seed-eating birds start with. Apparently cereals are more nourishing than insects! Young goldfinches are all fed at once, at long intervals and in a decorous way, without any of the excitement seen at some other nests where the parents have to hurry to keep out of each other's way, and only one chick is fed on each visit.

Most drawings depict goldfinches as rather stodgy or dumpy birds, but they are really particularly gay, joyous and graceful, with a carefree, buoyant flight. Their cry of distress is a plaintive *bid, bid, bid, bid-dee,* but the characteristic call is a ringing *per-chick-cree,* which is heard at its best when the male is returning from a foraging expedition with a full crop.

Regurgitation is not uncommon among birds, and doves afford a well-known example, but redpolls and siskins, cormorants and gannets have the same habit. There is a slight difference in procedure worth noting, for while young doves, like young cormorants, push their beaks into the open mouths of their parents, goldfinches do just the opposite and put their bills into the babies' mouths to transfer the food.

Beyond the Call of Duty

By LILLIAN M. CHAPMAN

"Blackie Halligan" is the name of probably the Pacific's most famous war bird. Like so many other seasoned veterans, "Blackie" came home to Fort Monmouth, New Jersey, with a brilliant record of long and heroic service as one of the Army's swift, dependable message carriers. He is credited with having saved the lives of more than one hundred soldiers.

This pigeon's "dog tag" reads—U.S.A.42-Ft-M-2615, which is the way the Army designates this black cock. He was hatched at Fort Monmouth and shipped, when still a young bird, to Camp Claiborne, Louisiana, for service with the 280th Signal Pigeon Company. Not long afterwards "Blackie" went with 1500 other birds to a West Coast embarkation point, and, finally, to Noumea, New Caledonia. From this base the future avian hero was attached to the 132nd Infantry Division, and went with this outfit to Guadalcanal. Although some of the birds refused to stay on this noise-ridden island, "Blackie" apparently had no thought of desertion.

The pigeon's post was on the Lunga River, a block from "Tojo's ice house," where veterans of Guadalcanal will tell you that the ruts were so deep you could hide a jeep in them. This spot was called the "catcher's mitt" because so many bombs fell in the area. It was to this spot that "Blackie" returned one day, bearing a message that gave the location of a nest of some three hundred Japanese. Badly wounded, with a shot through his crop and part of his breast torn, the bird came through with the message tube intact.

Immediately given first aid, "Blackie's" crop had several stitches taken in it, and he was given a special crate in which to convalesce. There he was visited by the late General Alexander M. Patch, Jr., who hung a medal about the pigeon's neck in recognition of his services beyond the call of duty. "Blackie" was also awarded the Purple Heart, and accumulated 141 points toward honorable discharge. He was returned to the States by special order of the Commanding General of the U. S. Army in the Philippines.

★

"I Will Lift Up Mine Eyes"

By LAURANCE M. THOMPSON

The old, old hills, whose soft curves feed the earth,
Worn down by glacier, wind, by rain and snow,
Warmed by the sun or chilled by splitting cold;
Clothed with the ever-growing, softening trees
Whose roots and leaves hold moisture, and whose shade
Protects the forest floor that makes the soil—
The old, old hills still stand to prove our faith.

That soil makes hillside pastures, and runs down
With rain and snow to make rich bottom land,
And little stream-side farms that make a home.
It washes down with freshets in the spring
To make the rivers muddy, and spread silt
Across the great wide valley, filling it
With all the richness from the upland farms.

So on and on the timeless process goes:
Those layers of rock within the age old hills
Were once laid down as silt by some slow stream,
And hold the tracks of beasts long ages gone,
Walking in mud which later turned to stone.
In very truth these are the old, old hills—
The hills which give us strength to carry on.

Warbler Time

By E. LAURENCE PALMER

Illustrations by Louis Agassiz Fuertes

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CHESTNUT-SIDED WARBLER

BLACK-POLL WARBLER

WATER-THRUSH

MYRTLE WARBLER

KENTUCKY WARBLER

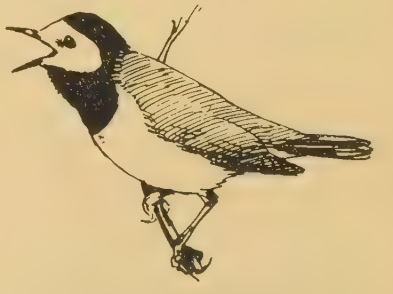
This is the forty-fourth in Nature Magazine's series of educational inserts.

COMES the dawn of a new year to our northern landscape after a season of cold weather and bird scarcity. How our bleak orchards and fields greet the first warbling bluebird as he perches on the bare cherry tree, alert to snatch up the earliest fly that stirs in the brown grass. Soon come the pioneer robins and, perhaps, a meadowlark, and still later a phoebe-calling chickadee, which has been here quietly all the time. Each of these finds a ready welcome from the lovers of the outdoors. Near the marshes the tree tops are dotted with grackles and blackbirds, and crows hold conventions that can be heard afar.

When these early arrivals put in their appearance, the trees are still mostly in their winter condition. The leaves and rudimentary twigs of the year are still safely housed in swollen but not in ruptured buds. But as the season advances, and growth begins to take place, these buds finally abandon their protective function, and from them issue flowers of the season, new shoots of tender leaves, or combinations of these. It is Nature's program that these new growths be tender, succulent and relatively non-resistant to outside influences. The burgeoning tree provides ideal lunch for hosts of small animals, such as the insects, which crawl in apparent glee over them, gorging themselves while they may, and, not infrequently, leaving scars or distortions that will long be apparent in the developed twigs, leaves and fruits. Unchecked, these voracious creatures might well change the whole appearance of our landscape, even as they obviously change the shape of an unsprayed apple tree.

When, from the tree's standpoint, all this injury reaches a climax, a real emergency exists. Unless their enemies can be kept under control, the trees cannot survive. The crows that roosted in their tops are off in the fields searching for grubs. The robins are on the ground seeking earthworms. The starlings are wrangling with the sparrows about nesting sites. Besides, none of these birds are suited to the

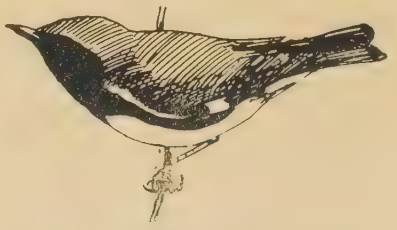
CANADA WARBLER



HOODED WARBLER

BLACKBURNIAN WARBLER

REDSTART



BLACK-THROATED BLUE WARBLER

intricate task of removing a diminutive caterpillar from beneath a crowded mass of developing leaves. This job must be done by birds so small that their weight will not break the finer twigs; birds small enough to probe the little places; birds that are active, hungry, and numerous. Otherwise, the flood of insects will overwhelm the flood of newly developed leaves and twigs. Into this emergency moves the host of dynamic little feathered creatures with which this insert is concerned. Besides the many warblers that stay to nest in our environs, there are those that breed over great stretches to the north. At no time in the year is the need greater for birds of the warbler type, and at no time of the year is the warbler population concentrated so heavily where it is most needed. Call this luck, Providence, Nature's scheme, or what you will, it is one of the nicest of the many fine adjustments between organisms that we can find in Nature, and here we use nice in its proper meaning of exactness.

No words about warblers could be more charming or more concisely descriptive of the importance of these birds than a paragraph from *Birds of the Colorado Valley* by Elliott Coues, 1878. Writing of these birds generally, this great naturalist speaks of "the 'various language' which they speak 'to him who in the love of Nature holds communion with her visible forms.' The Warblers have we always with us, all in their own good time; they come out of the South, pass on, return, and are away again, their appearance and withdrawal scarcely less than a mystery; many stay with us all summer long, and some brave the winters in our midst. Some of these slight creatures, guided by unerring instinct, travel true to the meridian in the hours of darkness, slipping past 'like a thief in the night,' stooping at day-break from their lofty flights to rest and recruit for the next stage of the journey. Others pass more leisurely from tree to tree, in a ceaseless tide of migration, gleaning as they go; the hardier males, in full song and plumage, lead the way for the weaker females and the yearlings. With tireless industry do the Warblers befriend the human race; their unconscious zeal plays due part in the nice adjustment of Nature's forces, helping to bring about the balance of vegetable and insect life, without which agriculture would be in vain. They visit the orchard when the apple and pear, the peach, plum, and cherry, are in bloom, seeming to revel carelessly amid the sweet-scented and delicately-tinted blossoms, but never faltering in their good work. They peer into the crevices of the bark, scrutinize each leaf, and explore the very heart of the buds, to detect, drag forth, and destroy those tiny creatures, singly insignificant, collectively a scourge, which prey upon the hopes of the fruit-grower, and which, if undisturbed, would bring his care to naught. Some Warblers flit incessantly in the terminal foliage of the tallest trees; others hug close to the scored trunks and gnarled boughs of the forest kings; some peep from the thicket, the coppice, the impenetrable mantle of shrubbery that decks tiny watercourses, playing at hide-and-seek with all comers; others more humble still descend to the ground, where they glide with pretty mincing steps and affected turning of the head this way and that, their delicate flesh-tinted feet just stirring the layer of withered leaves with which a past season carpeted the ground. We may seek Warblers everywhere in their season; we shall find them a continual surprise; all moods and circumstance is theirs."

BLACK AND WHITE WARBLER

MAGNOLIA WARBLER

PARULA WARBLER

BLACK-THROATED GREEN WARBLER

If our warblers fit beautifully into a time and need schedule, then it is not surprising that they fit well into a place schedule. In Grinnell and Storer's *Animal Life of the Yosemite* we find that seven species of wood warblers of the Pacific Coast area use seven almost distinct small areas as their nesting sites. This does not mean that all of one species nest in a few acres of land, while others nest in adjacent acreages. Rather, it means that in any given acre there are niches or spots, such as tree tops, forest floor, stream banks, hollows in trees, and so on, that represent the typical nesting area of one species of warbler, while other locations serve the needs of other warbler species.

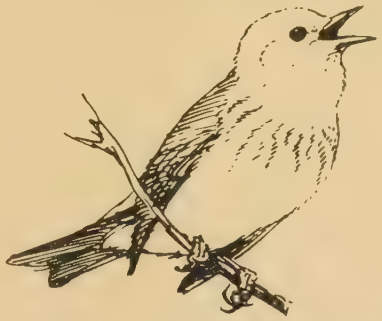
This same situation exists with the eastern relatives of these western species, and to aid in the recognition of these distinctive areas in one's own back yard, or neighborhood forest or glen, is one of the objectives of this insert. One is not likely to find a water-thrush competing for a nesting site with a yellow warbler, or a redstart fighting with a black and white warbler for a place to build a home. A glimpse at the notes on the breeding range in the tabular section will show that one would hardly expect breeding palm warblers or pine warblers to be particularly concerned about competition from black-poll warblers, whose breeding range is, for the most part, much farther north. If you happen to be one of the amateur naturalists whose only con-

cern is adding observation of a new species of bird to your lists for the day or season, it may pay you to slow down a bit and learn more about fewer birds rather than a little about so many. The warblers certainly are of the type that improves with acquaintance. And while you do, of course, want to get a glimpse of those transient species that are with you only a few days in the year, nevertheless the fun of knowing warblers really begins after these visitors have moved on to other lands. You who have surprised an ovenbird from its nest, or have accidentally put your hand into the nest of a waterthrush, or have watched a yellow warbler try to defeat the cowbird that has laid its egg in the warbler's nest, by building one or more nests above the first one, know full well that being a warbler fan means fun for weeks and months, and not for just a few days in late spring or early summer. Certainly, in the northern states, warblers can be seen almost any year before the last snows of spring and after the first snows of the fall. And, if we interpret the term warbler to include the kinglets, which are close relatives of the Old World warblers, we could say that there is probably no month in the year when a warbler, or close relative, cannot be found in our northern states.

MARYLAND YELLOWTHROAT

WILSON'S WARBLER

BAY-BREASTED WARBLER



YELLOW WARBLER

Technically speaking, we should call our warblers wood warblers. They are members of the Family Compsothlypidae, rather than of the Family Sylviidae, which includes the gnatcatchers, kinglets and Old World warblers. While two of the Old World warblers spend the summer in continental North America, few readers of these pages will find them, since they are found on our continent only in western Alaska. The related gnatcatchers and kinglets, in one form or another, may be found at almost any time in almost any settled part of the continent.

While the wood warblers intrigue us by their range, their migratory habits, and their relationships, they do not stop there. Those of us with relatively poor memories for melodies find that each season we must begin all over again to learn the songs and calls of these birds, which often are more difficult to see than they are to hear. This fact has provided a field day for those who attempt to imitate bird songs by whistling. If the audience cannot remember the song of a particular warbler, how can it judge properly whether the pretty warble of the often quite human whistler is truly representative? I know of a few professional bird song imitators who palm off on audiences sounds the like of which are not produced by the reputed birds. This criticism does not apply to such whistlers as the late Louis Agassiz Fuertes, or to Bert Harwell of the National Audubon Society's lecture tours, but it does apply to every professional whistler I ever heard on the vaudeville stage.

It is fortunate that the late Albert Brand could not learn bird songs easily. This difficulty led to his sponsoring the making of mechanical recordings of the songs made by the birds themselves. The happy combination of the master ornithologist in Arthur Allen, the engineering genius of Paul Kellogg, and the benevolent interest of Albert Brand eventually gave us the bird records that have been so frequently advertised in the pages of *Nature Magazine.* These records have helped many of us to cut corners in the spring, and to get a jump on the returning birds. We can hear them before they get to us in their northward migration, and, because of this, we waste much less time trying vainly to remember to what particular bird a certain song belongs. The only regret about the records that most of us can express arises from the fact that we cannot get a complete sound library of the birds' songs of our neighborhood for a given time of the year. We can take sets of pictures and post those that represent birds of the season, but, as yet, we have not devised a loose-leaf method of filing recordings of bird songs. Someday we may be able to do this.

The twenty-third of these special inserts gave you a diagrammatic story of the songs of many kinds of birds, including some of the warblers. It showed, for example, that the song of the blackpoll warbler was close to the hearing limit of many human beings. Really, it is beyond the hearing range of some, particularly of older people. I know that, in my own case, there have been many times when I could not hear this song without it first being called to my attention. Once I focussed my efforts on hearing it, I could do so. Otherwise, it was almost invariably lost in the medley of other sounds that fill the air when these birds are at their best. A number of older naturalist associates of mine tell me that they have completely lost the ability to hear this song. So here is another interesting way to study our wood warblers through the years. Use them as an instrument of measurement of your hearing ability, as well as a criterion for determining your ability to remember bird songs. When and if the time (Continued on last page of this insert)

COMMON NAME SCIENTIFIC NAME	BLACK AND WHITE WARBLER *Mniotilta varia*	PARULA WARBLER *Compsothlypis americana*	YELLOW WARBLER *Dendroica aestiva*	MAGNOLIA WARBLER *Dendroica magnolia*
DESCRIPTION	Length: to 5.5 inches; wing-spread, 9 inches; tail, 2.25 inches. Weight: .35 ounce. Covered lengthwise with black and white stripes. Creeps over trunk of tree, like nuthatch or brown creeper. Can hardly be confused with any other bird. Female: smaller and duller than male.	Length: to 4.9 inches. Wing-spread: to 7.75 inches. General color: bluish, with yellow breast and throat and a less conspicuous yellow patch on the back. There is a dark band across the yellow of the breast and two broad white wing-bars. Female lacks the breast band or shows it only obscurely. It is also smaller than the male.	Length: to 5.25 inches; wing-spread, to 8 inches; tail, to 2.25 inches. Female: smaller than male. Appears superficially to be all yellow. Seen near at hand, male shows breast to be streaked with chestnut-red, which markings are faint or lacking in the female. No other associated bird gives the impression of being all yellow.	Length: to 5.1 inches. Wing-spread: to 7.8 inches. Female: smaller than the male. Male: essentially black and yellow; tail, white below, with broad black band at tip; from above, appears to have large white patches on wings and tail; underparts, yellow, with many, heavy, black streaks. In fall: brown above and yellow below, with tail as described above.
RANGE	Breeds: from west-central Mackenzie to Newfoundland and south to Texas and Georgia. Winters: from southern Texas and Florida to Colombia, Ecuador, Venezuela and in southern California and Lower California. It is accidental in Bermuda and in the state of Washington.	Breeds: from eastern Nebraska to Cape Breton Island and south to Texas, Louisiana and Maryland, with the southern subspecies from District of Columbia to Alabama and Florida. Winters: Bahamas and West Indies to Barbadoes and from Vera Cruz to Nicaragua with southern subspecies in Florida and the Bahamas. A bird of the tree tops.	Four subspecies include: the Eastern, the California, and the Sonora yellow warblers. The Eastern, breeds from eastern Alaska to southern Ungava and south to Nevada, New Mexico, northern Georgia and South Carolina. Winters: from Yucatan to Guiana, Brazil and Peru.	Breeds: from western Mackenzie, central British Columbia to central Quebec and Newfoundland and south to southern Saskatchewan, Minnesota, New York, Massachusetts and in mountains south to Virginia. Winters: from southern Mexico to Panama and sometimes in Cuba and the Bahamas.
REPRODUCTION	Nests: on ground in a wooded area, usually at foot of tree or shrub. Nest: a mere depression in the leaves, or fashioned of finer plant materials. Eggs: 4 or 5; creamy white, thoroughly spotted with chestnut, brown or lavender; .75 by .59 inches. Egg-weight: .04 ounce. Incubation: by female, 13 days. Annual brood: one.	Nests: usually in evergreen tree, in bogs and swamps where air is humid and lichens hang from the branches. Nest: in a bunch of moss hollowed out, with a side entrance, sometimes with a hair lining. Eggs: 3 to 7, .77 by .5 inches; white to creamy, with brown and gray spots. Nests: mostly in June. Incubation: by female, with one or two annual broods.	Nests: about farm lands, and in suburban areas in low trees or ornamental shrubs and hedges. Nest: a compact sphere, well lined with fine grasses, bark, and rootlets or hair. Eggs: 3 to 6; gray or greenish, with brown or purple markings around larger end; .75 by .53 inches. Incubation: 9 to 15 days, by female. Annual broods; 1 or 2.	Nests: usually in June. Nest: usually in an evergreen up from 1 to 35 feet above the ground but usually low, of leaves, bark and roots fastened together with cobwebs, with soft lining. Eggs: 3 to 6; .72 by .5 inches; white, with brown, purple and lavender spots. Incubation: usually by female though male may assist occasionally. One or two annual broods.
FOOD HABITS	Food: insects such as plant lice, scale insects, caterpillars, gypsy moths, brown-tail moths, click beetles, forest tent caterpillars in adult, egg, larval or pupal stages, gleaned from trunks and branches of trees. Call: thin, wiry sound just audible to many people and inaudible to others. Song pitch: 5,300 to 8,050 cycles per second.	Young are able to fly by about late August when a slow southern migration begins. Food is probably mostly or exclusively insects gleaned from trees and shrubs but measuring worms are known to be favored in the diet and tent caterpillars and gypsy moth caterpillars are also eaten.	Food: insects such as small moths, caterpillars, beetles, flies and grasshoppers, many of which are caught in the air by pursuit through the tree tops. Cowbirds commonly lay their eggs in yellow warbler's nests and often yellow warbler then builds a second or even to a sixth on top of the first in cases of this sort.	Most active about evergreen trees where they nest. Young remain in the nest about 10 days after hatching. After leaving the nest, young and their parents move about for only about 2 weeks before beginning the southern migration. Food: probably exclusively insects, mostly of the tree tops.
ECONOMIC IMPORTANCE	This lovable bird is so confiding that one feels genuine resentment every time he sees a domestic cat anywhere near where the bird may be active. Value as a gleaner of insects from tree trunks cannot be questioned, but its numbers near centers of human population are not what they should be if the region is to be thoroughly enjoyed.	Useful in destroying insect pests of common woody plants. Song: a trill, buzzing up the scale and dropping near the end. Plumage changes slightly through the year, the female in winter having the blue areas more greenish, while the young are olive brown to gray above, and have pinkish feet that become gray with age.	Entirely useful as a destroyer of insects and one of the most interesting and beautiful birds of the thickly populated parts of the country. Its habit of nesting in parks and in ornamental shrubbery, and its cheery song, make it well known and welcomed by many who never notice other species. Song pitch: 3,475 to 8,775 c.p.s.	Most interesting to bird-lovers and undoubtedly useful as insect destroyers, with no known habits injurious to man's interests. With the cutting down of evergreen timber or with fire damage to such growths, these birds decrease in numbers definitely.

BLACK-THROATED BLUE WARBLER *Dendroica caerulescens*	MYRTLE WARBLER *Dendroica coronata*	BLACK-THROATED GREEN WARBLER *Dendroica virens*	BLACKBURNIAN WARBLER *Dendroica fusca*	CHESTNUT-SIDED WARBLER *Dendroica pensylvanica*
Length: to 5.5 inches; wing-spread, to 7.88 inches; tail, to 2.25 inches. Female: smaller than male. Upper parts: bluish gray; throat and sides, black; breast and belly, white. Female and young: a plain olive back, with a narrow white line over the eye. the name adequately describes the male bird. A small white patch near base of outer primaries, conspicuous in male; less so in females and young.	Length: to 6 inches; wing-spread to 9.4 inches; tail, to 2.77 inches. Weight: to .45 ounce. Shows a conspicuous yellow rump. Male: in spring, blue-gray above on crown and sides. Female: brown where male is blue; otherwise similar. Adults in winter: brown above; *yellow* rump in all plumages.	Length: to 5.3 inches; wing-spread, to 8 inches. Female: smaller than male. Back and crown: olive green. Face: yellow. Throat: black. Female: with black of throat and underparts less conspicuous. Young and females in autumn: without black on throat and upper breast and with underparts yellowish.	Length: to 5.5 inches; wing-spread, to 8.5 inches. Female: smaller than male. Male: bright orange on head and throat region, but otherwise mostly black and white, with white patches on elbow and tail showing conspicuously in flight; paler in autumn. Female: dingier in more conspicuous areas.	Length: to 5.25 inches; wing-spread, to 8.25 inches; tail, to 2.1 inches. Female: smaller than male. In spring, adults show conspicuous yellow crowns and chestnut sides differing in this respect from dark crowned, chestnut-throated bay-breasted warbler. In fall, are greenish above, white below, with 2 wing-bars and white eye-ring.
Breeds: from northern Minnesota to southern Quebec and south to southern Minnesota, the mountains of Pennsylvania and northern Connecticut. Winters: from southern Florida and the Bahamas to Guatemala and Colombia. In migration, is found also in North Dakota, Nebraska, Kansas, Colorado, New Mexico and sometimes in California.	Breeds: from northwest Alaska to central Quebec and south to northern British Columbia, northern Minnesota, central Ontario, New Hampshire, Maine, New York and the New England highlands. Winters: Kansas and Ohio valley and New Jersey and south to Mexico, Panama and in West from Oregon to northern Lower California. Found in Siberia.	Breeds: from northern Alberta to Quebec and Newfoundland and south to southern Minnesota, southern Wisconsin, New York, and northern New Jersey and in Appalachian highlands on to South Carolina, Georgia and Alabama. Winters: in Mexico, Guatemala, Costa Rica and Panama. On occasion found in Greenland, Europe and Porto Rico.	Breeds: from central Manitoba to Cape Breton Island and south to central Minnesota and Connecticut and in Appalachian highlands to Georgia and South Carolina. Winters: Venezuela and Colombia to Peru and Yucatan. Occasionally in migration in Nebraska, Texas, Kansas, Montana, New Mexico and the Bahamas.	Breeds: from central Saskatchewan to Newfoundland and south to eastern Nebraska, northern New Jersey and in the Alleghanies, south into Tennessee and South Carolina. Winters: from Guatemala to Panama. Occasionally, in California, Mexico, Greenland, Florida and the Bahamas.
Nests: usually in a deep woods or at the edges of clearings. Nest: in a tree or bush, 3 to 10 feet above the ground, bulky outside, and neat within, with a lining of hair, webs, needles and grasses. Eggs: 4 to 5; grayish, greenish or brownish, with brown, lilac or lavender spots and blotches. Incubation: by female, for an unknown length of time.	Nests: usually in coniferous woodlands, with nest from near ground to 40 feet up. Nest: bulky, of stems, twigs, bark, grass, bound with cobwebs and lined with hair and feathers. Eggs: 3 to 6; white to creamy, with spots of brown, purple, lavender or even black; .8 by .55 inches. Incubation: 12 to 13 days, chiefly by female. Annual brood: one.	Nests: among trees like pines, usually from 15 to 70 feet above ground, on horizontal branch. Nest: of twigs bound with spider webs and lined with needles, feathers or hair. Eggs: 4; .73 by .53 inches; creamy white or white, spotted and speckled with brown, purple or gray. Nests: in June. Incubation: 12 days, chiefly by female. Annual broods: one or two.	Nests: usually in evergreen tree from 6 to 80 feet up, usually towards end of limb or in top of tree. Nest: highly variable, usually of twigs, with hair, rootlet, grass or feather lining. Eggs: 4; .72 by .54 inches; blue-green to gray, with brown and lavender spots and blotches. Incubation: in June, mostly by female.	Nests: in shrubbery, near pasture, at margins of woodlands, usually 1 to 6 feet up. Nest: neat, compact, of grasses, weeds, bark, cemented with spider webs and lined with plant down. Eggs: 4 to 5; white or brown, with brown or lavender spots; .69 by .52 inches. Incubation: for 10 to 11 days. Annual broods: 1 or 2, reared by both sexes.
Food: essentially animal matter, mostly insects gleaned from trees. Female makes excellent effort to protect her young by hiding them in a nest or by pretending injury to herself to attract enemies away from the nest. Male may or may not assist in this family function.	While most warblers live almost exclusively on insects, the myrtle can exist for a long period on fruits of red cedar, juniper, Virginia creeper, mountain ash, poison ivy, dogwoods and viburnums. In New England, chief plant food is fruit of bayberry. During spring and summer, diet is essentially insects and other small animals.	Young remain in nest 8 to 10 days after being hatched and while there are defended by female. By mid-August, the southern migration starts rather leisurely though second brood may be near end of month before starting. Food: largely caterpillars, beetles and bugs of woody plant leaves, particularly leaf-rollers and cankerworms.	An active conspicuous bird of the tree-tops, with a repeated *zip* call on one pitch but ending with a thin, higher pitched note. In northern migration, it moves just about time leaves are reaching full size. Food: mostly insects of tree-tops, with some caught by sudden dashes into air. Some known to subsist on ivy berries.	Excellent insect catcher. Food caught in gleaning or in short dashes into air. Known to eat gypsy moths, tent caterpillars, brown-tail moths, plant lice, leaf hoppers, ants, borers. One of the best caterpillar destroyers. Young: in nest about 9 days, fed little besides insects. Adults may eat some seeds and wild fruit in the fall.
Food habits and general behavior are such that it must be considered useful even if it does not win favor by its beautiful appearance and interesting habits. When males begin singing high in trees in migratory area one knows that spring has really arrived. Song pitch: 5,125 to 6,750 c.p.s.	Highly useful, as 78% of its food for year is animal matter, largely injurious insects. A pleasure to have bird in abundance, because it comes before most other warblers and resists severe weather better than similar birds.	Useful as a destroyer of enemies of trees and by some considered one of the most useful of birds of woodlands. Song is like a lisping sneeze, *zoo-zee-zee-zee-zee-zoo-zee*. Beauty of the bird makes anyone who sees it an immediate and permanent friend.	Economic status is that of most warblers in that it destroys great numbers of insect enemies of woody plants and in this particular case satisfies the longings of bird lovers for an active, beautiful and useful bird.	An unusually beautiful, if rather shy bird probably more often heard than identified. Two adults attending young in nest make a picture; once seen, always remembered. Song pitch: 3,100 to 8,775 c.p.s.

COMMON NAME SCIENTIFIC NAME	BAY-BREASTED WARBLER *Dendroica castanea*	BLACK-POLL WARBLER *Dendroica striata*	LOUISIANA WATER-THRUSH *Seiurus motacilla*	KENTUCKY WARBLER *Oporornis formosus*
DESCRIPTION	Length: to 6 inches; wing - spread, to 9.3 inches; tail, to 2.25 inches. Female: smaller than male. Dark chestnut throat, upper breast and sides and pale, light brown spot on side of neck should be sufficient identification. Lacks white throat and yellow crown of chestnut-sided warbler.	Length: to 5.75 inches. wing - spread, to 9.7 inches; tail, to 2.25 inches. Female: smaller than male. Male: in spring, with solid, black cap instead of streaked cap of black and white warbler. Female: in spring, less heavily streaked; greenish above, pale below. Adults: in fall, olive above, with two white wing-bars and dingy, streaked, yellow below.	Length: to 6.4 inches; wing - spread, to 10.75 inches. Female: smaller than male. This differs from the northern water-thrush in being less yellow beneath, and without the yellow line over the eye. In this species, line over eye is pure white. General color: grayish olive with brown streaks on the lighter underparts.	Length: to 5.85 inches; wing-spread, to 9.25 inches Female: smaller than male. Conspicuously contrasting plain olive above and light yellow beneath. Black streak from eye to the side of the yellow throat, dark to black forehead and a yellow hook or streak from the bill over and back of the eye. Olive where Canada warbler is gray.
RANGE	Breeds: from east-central Alberta, to Newfoundland and south to southern Manitoba, the Adirondacks in New York and the mountains of New Hampshire. Winters: in Panama and Colombia. Occasionally found in Greenland, Texas, Montana and South Dakota.	Breeds: from tree limit in northwestern Alaska to Newfoundland and south to northern British Columbia and highlands of New York and New England. Winters: from Guiana and Venezuela to Brazil, migrating through the Bahamas and the West Indies. Occasionally in Mexico, Chile and Ecuador.	Breeds: from eastern Nebraska and southeastern Minnesota to southern Ontario and New England to Texas, southern Alabama, northern Georgia and central South Carolina. Winters: from northern Mexico to Colombia, the Greater Antilles, Antigua and the Bahamas. Accidental in California.	Breeds: from southeastern Nebraska to the lower Hudson valley and south to eastern Texas and northern Georgia, southern Alabama and Louisiana. Winters: in Mexico from Tobasco, Campeche and Chiapas through Central America to Colombia. Accidental in Cuba, Vermont and Michigan.
REPRODUCTION	Breeds: in mixed forests or coniferous stands. Nest: in conifer, from 3 to 20 feet up, of fine twigs and moss, with rootlet, hair or needle lining. Eggs: 3 or 4; blue--green or gray-green, with brown or lilac spots; .73 by .56 inches. Incubation: by female. Annual brood: one.	Breeds: among coniferous forests or swampy groves. Nest: low in evergreen or on ground, of mosses, lichens and feathers. Eggs: 4 to 5; creamy-gray, speckled and spotted with reddish brown, purple gray or lilac; .74 by .54 inches. Incubation data not available.	Nests: in crevice in a rock bank that is wooded and near a small, active stream or in a swampy area. Nest: lined with moss and dry leaves, and surrounded with a bulky mass of leaves. Eggs: 4 to 7; .9 by .7 inches; glossy and polished; white, with variable markings of brown and lilac gray. Nests: in May and June. Incubation: 12 to 14 days, mostly by female.	Nests: in open or in undergrowth at edge of woodlands or in brushy areas near marshes, on or near ground in thick growth. Nest: bulky, of grasses, leaves and stems, with lining of hairs, roots or both. Eggs: 4 to 6; .79 by .6 inches; glossy white, with brown spots, speckles and blotches. Incubation: by female. Two annual broods sometimes.
FOOD HABITS	Food habits little understood but known to include destruction of locusts, caterpillars, ants, beetles, leaf hoppers which are fed to the young. Spends most of its time in the dense foliage of trees and so is not so easily seen as are some of the other wood warblers.	Food: essentially insects gleaned from trees to include cankerworms, webworms, plant-lice, locusts, small grasshoppers, beetles, ants and gnats. Call: sounds like noise made by cutting glass, not audible to many people. Pitched: 8,050 to 10,225 c.p.s. In migration, probably fly several hundred miles across Caribbean to reach land.	A bird of the active gorges much like the water-ouzel of the West in its habits and haunts. It runs about at the edge of rapid water but does not submerge in it as does the water-ouzel. Song: stimulating in the extreme, loud, sweet, vigorous and always popular and awaited by bird lovers.	Commonly feeds on ground but sings its loud, repeated *turtle turtle* from the tree-tops. Active but shy and usually suspicious. Male sings almost continually in height of breeding season. Young leave nest in about 8 days, and after the nesting is over the birds are quiet and secretive.
ECONOMIC IMPORTANCE	Useful as insect destroyer like the other warblers. In the autumn, abundance may not be suspected as they appear olive green, with two, white wingbars and a rather dirty, brownish yellow beneath. In fall, it is yellow under the tail, while the blackpoll is white there and has more distinct streaks.	Probably of considerable importance because of great numbers which migrate north at time of the year when new growth of woody plants is most susceptible to attack from the very insects that provide these birds with their food. Always interesting to those who care for birds in their season.	Food largely insects and other small animals gleaned from area that has little economic importance. From a dollar and cents standpoint, the bird probably does little good but from an emotional standpoint it ranks high with the bird lovers fortunate enough to have the opportunity to know it well.	Food: largely insects including grasshoppers, plant lice, larvae of moths, beetles and other insects. These are gleaned mostly from areas near the ground and include ants not common to the environment of many warblers.

MARYLAND YELLOWTHROAT *Geothlypis trichas*	HOODED WARBLER *Wilsonia citrina*	WILSON'S WARBLER *Wilsonia pusilla*	CANADA WARBLER *Wilsonia canadensis*	REDSTART *Setophaga ruticilla*
Length: to 5.75 inches; wing - spread to 7.2 inches; tail, to 2.05 inches. Male: olive above, yellow beneath and with conspicuous black mask across the face and side of the head. Female and young: plain olive, with yellow throat and breast, but no black mask, and with whitish belly instead of the yellow belly of the yellow warbler.	Length: to 5.75 inches; wing - spread, to 8.5 inches. Female: smaller than the male. Male: with black hood that encircles completely the head and neck, a yellow face and forehead, yellow underparts and olive back. Females and young: with bright yellow on underparts and forehead, and plain olive upperparts. Bill: black. White on tail.	Length: to 5.1 inches; wing-spread, to 7 inches. Female: smaller than male. Male: pale olive above, light yellow beneath and with small round black cap. Female shows white spots on tail thus differing from the yellow of the yellow warbler. No streaks or bars.	Length: to 5.75 inches. Female: slightly smaller than the male. Male: with upper parts plain gray and lower parts bright yellow, and with a necklace of short, blackish stripes across the upper breast. Female: without the necklace. No white on wings or tail of either sex, thus differing from some otherwise related species.	Length: to 5.75 inches; wing, to 2.57 inches; tail, to 2.45 inches. Female: smaller than male. Male: black, with orange patches on wings and tail; belly, white. Female: olive, with lemon yellow patches on wings and tail. Young: much like female. Young breeding male may yet lack salmon-orange and black coloration of adult male.
Six subspecies include: the northern, the Maryland, the Florida, the Western, the Salt Marsh and the Tule yellowthroats. Northern: breeds from Newfoundland to Quebec and south to Pennsylvania; winters, from Mexico to Costa Rica and in the Bahamas. Other subspecies extend range over most of the United States, and southern Canada.	Breeds: southeastern Nebraska to the lower Connecticut River valley and south through Louisiana, Alabama, Georgia and northern Florida. Winters: from Vera Cruz and Yucatan to Panama, with records from the Bahamas, Cuba and Jamaica.	Breeds: from central and northwestern Mackenzie to Newfoundland and south to southern Saskatchewan, New Hampshire, Maine and Nova Scotia. Winters: in eastern Central America north to Mexico and south to Guatemala and Costa Rica. Migrates chiefly along the Appalachian highlands and across the Gulf of Mexico.	Breeds: from southern Alberta to Newfoundland and south to central Minnesota, central New York and Connecticut and in the highlands to Georgia and Tennessee. Winters: in Ecuador and Peru and to some extent in Guatemala and Costa Rica, in migration to eastern Mexico.	Breeds: from northern British Columbia to Newfoundland and south to Oregon, northern Utah, Oklahoma, Arkansas, southern Alabama, northeren Georgia and North Carolina. Winters: in West Indies and from central Mexico and southern Lower California to Ecuador and British Guiana. Occasional in California, Arizona and northern Ungava.
Nests: in thickets, in cat-tail marshes and in meadows and hedgerows. Nest: of dried leaves and grasses lined with grasses, roots and some hairs, bulky, deep, but well concealed for breeding season. Eggs: 3 to 5; white with brown or purple spots and streaks, particularly at the larger end; .78 by .6 inches. Incubation: 12 days. Annual broods: two.	Nests: in brushlands or dense undergrowth in woodlands or wooded marshlands of hillsides. Nest: from 1 to 5 feet up, in a bush or small tree, of leaves, bark, weed stems, with lining of plant down, moss, hairs, grasses and pine needles. Eggs: 3 to 5; .8 by .58 inches, white or creamy with brown spots. Incubation: by both birds. Annual broods: one to three.	Nests: in swampy bushlands, on the ground or even in a depression in it among the bushes, of grasses, with finer grass and hair lining. Eggs: 4; .67 to .5 inches; white with spots and splashes of reddish brown or lilac gray particularly around the larger end. Nests: in June. Incubation: by female. One annual brood.	Nests: on or near ground, in wooded or swampy wooded areas. Nest: well concealed, of dried leaves, grass, moss, bark, with a lining of rootlets and hairs. Eggs: 4 to 5; .73 by .55 inches; white or brownish white, with speckles of reddish brown and lilac chiefly around the larger end. Nests: in June. No data on incubation, but one annual brood is the practice.	Nests: in young or scattered woods. Nest: in upright crotch, from 3 to 35 feet above the ground, compactly woven and beautifully lined with grasses and leaves, fastened together with webs. Eggs: 3 to 5; creamy or grayish, sprinkled with lilac, purple or brown; .7 by .51 inches. Incubation: by female, 12 to 14 days. Annual brood: one.
Food: essentially insects, particularly smaller caterpillars that do so much damage to crops, also ants, aphids, grasshoppers, crickets, leafhoppers, spiders and other small creatures. The *witchity-witchity* call is one that varies over the country slightly, but is easily recognized as having delightful common properties.	Normally a shy bird sticking close to its home thickets but sometimes individuals are otherwise. Opens and closes tail like a fan while singing in flight. Male will defend territory rather effectively at times. Southern migration may begin as early as August unless a second brood is being raised.	Quick energetic bird, often acting like a flycatcher in procuring its insect food on the wing, in which cases the bill may sometimes be heard to snap. It also twitches its tail in a rotary fashion. The southern migration begins in August, and most birds have left northern range by end of September.	Active bird, in migration giving a rather loud song that is musical and by some has been described as a repeated *rup-it-chee* ending in a *rup-it-chit-it-lit.* It catches its food of insects on the wing like a flycatcher or gleans it from the finer vegetation in which it lives or even from the ground.	Food: includes caterpillars of many sorts as well as moths, gnats, bugs, beetles, grasshoppers, flies and other insects, probably including useful as well as injurious forms. Male is active bird whose song pitched at 4,400 to 7,300 c.p.s. means summer to most of those who know it. In display, salmon and black, coupled with active movement and long tail, makes bird conspicuous.
The bird is one of the most useful of species and fortunately is present over its range in considerable numbers. The activity displayed by a yellowthroat on a hot summer day is something worth observing. It sings as it works far into the summer.	Food consists of insects many taken on the wing and including grasshoppers, crickets, caterpillars and plant lice would indicate that it is a useful species. Song is a clear, sweet *weeta weeteo* dropping at the end and being very musical.	Since the food is largely insects it is probably a useful species though no exhaustive study seems to have been carried on. Its song is simple, drops at the end and sounds a bit like a repeated *chee chee.* The distinctive black cap provides an excellent field mark for its identification.	Food habits so far as known indicate that it is a useful species engaged in keeping in control the insects that might otherwise injure plants even though the plants thus protected are not ordinarily recognized as being of agricultural importance.	Unquestionably redstarts are useful and equally true is it that they are popular with all who know them either from their nest, their song, or their coloration and activities. They deserve the protection they get from the law and should be afforded more protection from tree-climbing cats.

comes that you cannot hear a Maryland yellowthroat, or a Louisiana waterthrush, or an ovenbird, then your hearing is really slowing down. Your only alternative is to seek some interest in Nature that can equal that provided by bird songs, and this is usually hard to find.

For many years my bedroom was within a few yards of a small waterfall and a mixed forest. For many of those years, I waited avidly the return of a pair of water-thrushes that nested near the brink of these falls. They could be counted on to be at that very spot year after year, and annually I showed this nest to my students. Of course, I made a point never to disturb the nest, and somehow the habit carried on after the nesting season. Then one year one of the finest students I ever had developed the nest-collecting disease. She felt she had to add a nest of a water-thrush, and, since the only one she knew about was the one in my side yard, she took that. I was disturbed about it but I said nothing, thinking that another year the warbler would return to its old nest site and build a new nest. It did not, and as long as I lived by that waterfall after that I never again found a water-thrush nest there. Of course, the neighborhood cats may have become too abundant, but somehow I have felt that the real cause was that, to that water-thrush, the old home did not look really comfortable and so a new site was selected. Frankly, if I ever get another of these birds to nest near my home, I shall protect its nesting site as religiously as I protect my home.

If we admire warblers for the color variations they present, for their feeding habits, range and home sites, we should also be intrigued by the variety of nests they build. The careless abandon of a water-thrush nest is a far cry from the cumbersome daintiness of a yellow-warbler's nest, or the cozy security to be found in a nest of a redstart, or the masterly skill with which an ovenbird hides its nest under some leaves on an apparently open forest floor. The tables will suggest some of the more important variations to be found in the materials used by different warblers in making their homes. Leaves, pine needles, down, hair, twigs, cobwebs, grasses, shreds of bark, tiny rootlets—all are materials essential to these birds for their building.

One of the nice but also discouraging features about studying the wood warblers is that when you once feel that you have reached a point where you think you know them fairly well, they have either moved on to other lands, have ceased singing the song that helped you make your identification, or have molted the feathers that confirmed your recognition of the different species. It is one thing to know the warblers in the spring, when they are in full breeding plumage and in full song. It is another to recognize the same birds after the summer molt, and when they have begun their relatively unspectacular return migration to the south. Near the end of the spring migration, I gain some confidence in my determinations, but when the fall comes I make little pretense to speak with any authority to anyone on the positive identification of these birds.

Even in the spring warblers sometimes fool us. For example, I once felt that if I knew anything about warblers I knew how to distinguish between an adult male and an adult female redstart. Pairs of them had nested regularly in the woods by my house. Then, one year, I found what seemed to be two females apparently engaged happily in the usual activities characteristic of a mated pair. Inquiry from those who knew better than I disclosed that sometimes a male redstart may be sexually mature even though it still bears the plumage of the immature male. Again my confidence in myself was shaken. What I had come to accept as fact was not fact. I had to change a concept I had formed on incomplete information. That sort of thing tends to wreck any conceit one may have. It is a wholesome experience for anyone, even though it is not always a pleasant one.

When I took physics in college, years ago, I was told that certain laws were so firmly established that there was no possibility that they would have to be modified. Many of those laws are now so thoroughly changed that they are hardly recognizable. Not many years ago we were told that there was little likelihood that new species of birds would be discovered in the eastern part of the United States, where ornithologists by the thousands had for years made careful observations. In spite of this and within the last decade, the Sutton's warbler was discovered as a new species living relatively close to the part of our country where the greatest number of ornithologists have lived. This is only one of a considerable number of examples to show that wood warblers are worth studying.

Conservation Issues Call for Action

THAT conservationists face immediate problems of fundamental importance, and responsibilities of far-reaching significance, was evident in the sessions and discussions at the Twelfth North American Wildlife Conference sponsored by the Wildlife Management Institute and held in San Antonio, Texas, in early February. The future of many of our natural resources—and, therefore, of our country—depends upon the quality of leadership of these conservationists, and their ability to fight for what they know to be right.

Among the many issues considered at the meeting, four are perhaps outstanding—finances, land use, flood control projects, and the fate of migratory waterfowl. The Transactions of the Conference, to appear later, will report the sessions fully. In our own pages we will consider these vital matters at greater length as the need and opportunity offer. For the moment, and by way of brief report on the Conference, we will present concisely these major problems.

Money is ever a problem. Appropriations are certain to be a hot and immediate political issue. Conservation programs, on a low calorie if not starvation diet for several years, are likely to suffer without regard to their merit or need in the mad scramble to cut Federal outgo and live up to campaign promises. Cuts are possible in some places, particularly in the case of projects improperly classed under the heading of conservation. The multitude of high dam plans, many ill-advised, represent one logical place for saving. However, to cripple the already going concern of conservation by ignorant slashing of financial support would be folly and would court disaster. Conservationists must fight to hold the ground gained.

The issue of land use centers currently on the drive by powerful stockman interests to maneuver grazing lands now under Federal control back into the hands of the States or private interests—largely one and the same thing. Playing on the thoughtless tendency to doubt the integrity of all Federal bureaus—of whatever standing and proved vital worth—these interests are "on the grab." The course they seek to impose on the country would inevitably end disastrously. Admittedly a national survey of land use should be made, as proposed by the Society of American Foresters, but conservationists should, and must, fight the present plan for grazing land chaos, or the progress made in land and range management will be wasted.

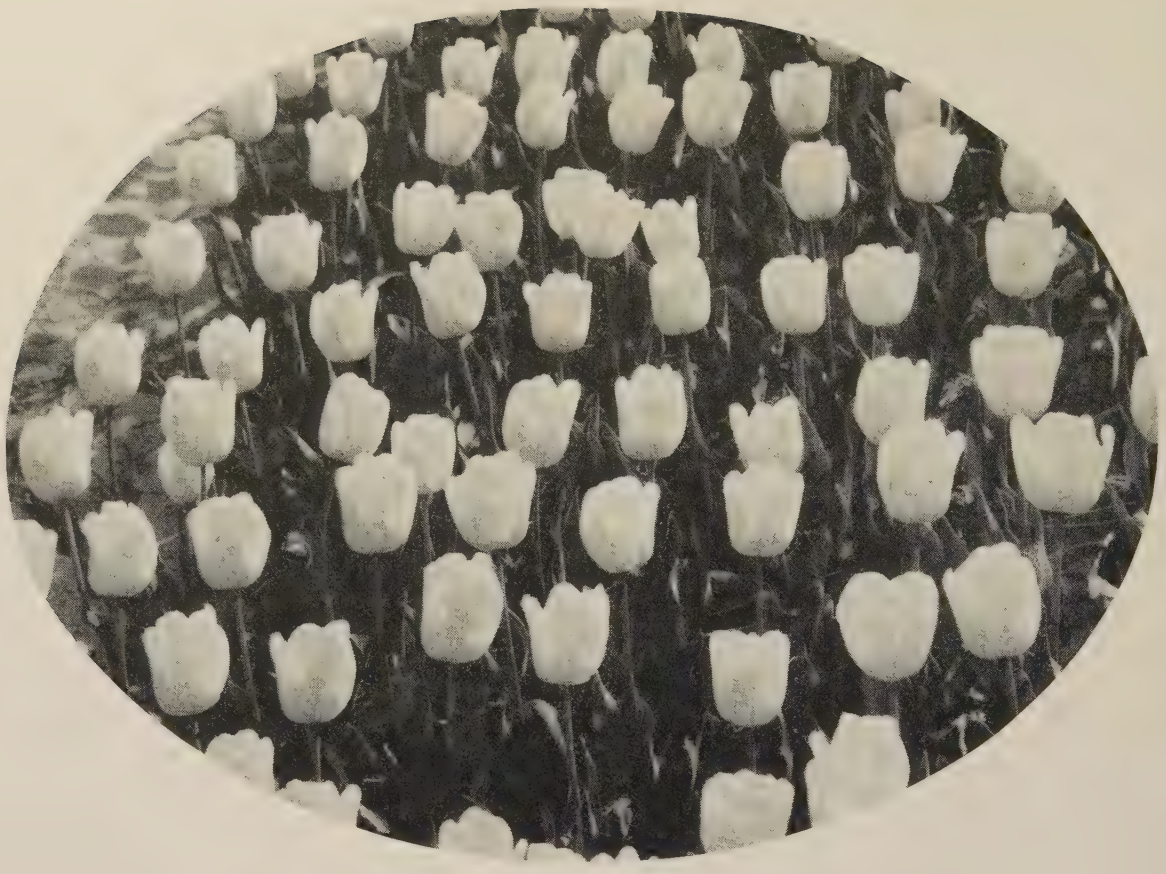
Six billion dollars' worth of flood control projects is in various stages of planning. These are something to keep the U. S. Army Engineers out of mischief in peacetime. The final cost of these proposals will be greater than the original figures, and many of them are questionable and would be carried through at the expense of other and greater values. Conservationists must demand that such plans be fully aired and completely justified before they progress to a point where they cannot be stopped.

The plight of our migratory waterfowl is alarming, and occupied much of the attention of the Conference. Harrison F. Lewis, Superintendent of Wildlife Protection for Canada, cited dire reports from all parts of the Dominion. "All across Canada," he declared, "the number of game ducks is down and going lower, and the number of hunters is up and increasing. It must be obvious to all that without adequate increase in restrictions, duck-hunting on this continent will soon encompass its own destruction."

This is solemn warning not only to duck-hunters but to the larger body of the population interested in wildlife for wildlife itself. These words from our neighbor to the north were underlined in an address entitled "Waterfowl at the Crossroads" by Clarence Cottam, Assistant Director of the U. S. Fish and Wildlife Service. Over-shooting and unfavorable climatic conditions, he said, are the major factors in the alarming decrease in numbers of ducks and geese. The greatly increased hunting pressure has resulted in a very high kill. Losses of birds by crippling and other wastage is appallingly high.

Answering the question that was the theme of the waterfowl session—"Is Wildfowling on the Way Out?"—Dr. Cottam declared that "while the sport is now headed precipitously downhill, *it need not* become a thing of the past if supported by intelligent, cooperative action of all persons, agencies and States." Dr. Cottam refused to anticipate the 1947 waterfowl hunting regulations, pointing out that they must be based on the winter inventory and the coming nesting season. Even more drastic restrictions than the past year seemed imminent and necessary, however.

Sketchily, therefore, these are major issues confronting all conservationists today. They constitute an unmistakable call to vigorous action.



When April Comes—

planting time is just around the corner

By ANDREW S. WING

Executive Secretary, National Garden Institute

FICKLE April is here with all her charms and wiles. Do not allow yourself to be misled by her good behavior; sunshine and smiles today may be followed by cold winds and a frowning countenance tomorrow. And yet it is definitely time to begin outdoor work in the garden, except in most northern regions, or where high altitudes make the growing season short. In the warmer sections of the country, people have already started their gardens from seeds outdoors in February and March, and will be harvesting early crops this month.

Before we settle down to the serious matter of garden work, suppose we take a look around to see what April is offering us in the way of plant interest and beauty. She has touched her fingers to the swamp maples and elms, the shadblow and the early star magnolia; given new life to such charming shrubs as Korean forsythia with its golden bells, the Japanese andromeda, and the Nanking cherry; waved her wand over the delicate, peach-pink blooms of the Korean rhododendron. The peepers are making music in the swamps, crows are cawing, and song birds are flying in from their winter vacations in southern lands. It will soon be time to look for anemones, hepaticas and marsh marigolds, while the skunk cabbages along stream bank and in marshy meadows have long ago changed their red brown horns for true green leaves. Ferns are starting to unroll their tender green fronds, and the buds on birches, weeping willows and other trees are unfolding their soft green leaflets.

In the garden, crocuses are being followed by early daffodils. In warm spots the earliest dwarf irises are opening up purple or golden balloons. Dutchmen's breeches and dogtooth violets brighten hillsides and woodsy glens. Yes, April is an exciting month in the garden, or in the countryside! The warm earth breathes forth scents of fertility and fruitfulness that we know bring promise of beauty and good things for the table later on.

The past two years have given so many parts of the country such warm weather in early spring that some may be confused into thinking that the "climate has

"Sweetheart" bleeding heart, an all-season perennial that is a Jackson and Perkins novelty. It is easy of culture and can be depended on for a constant display. It is happy in regular borders and excellent for rockeries.

changed," and that we may expect the same early season again this year. It is possible, but the weather man points to his records and warns that the law of averages still holds good. So plant only the hardy things now, holding back the corn and beans and the other tender crops until the weather is really settled and warm. Of course, if you wish to take an early chance with a few short rows of the tender things that you can protect, you may get away with it. At worst you will not lose anything but a few cents' worth of seed and the labor of planting. In general, however, very early planting does not pay. I have learned this from my own experience and by comparing notes with other seasoned gardeners. Last spring early planted corn did come through a spell of cold, wet weather to mature a week or ten days earlier than that planted at the normal time—about May 15; but it was not a month earlier in ripening as it should have been, if the corn had grown at the normal rate during the first few weeks after planting. Beans planted in April also came through, but never did amount to as much as those planted in May. I am speaking now of a garden near the seashore in southern Connecticut, a well-drained, loamy soil, and in a sunny, protected spot. Sites and soils have a great deal to do with the earliness of a garden, even in the same neighborhood.

Of course, there are crops that should go in just as early as the ground can be worked. Peas are one of these, especially if you plant a crop of the early dwarf, smooth peas, the hardiest of all. The large wrinkled peas are more safely planted a little later, as they contain more sugar and rot more easily in the ground. It is safe to say that in most localities you had better plant peas early, or not at all, as they are a cool weather crop. The same holds for spinach and onion sets. Lettuce and radishes should go in now for early crops, but do not plant them all at this time. Plant short rows and save portions of each packet back for later succession plantings. Carrots and beets can be safely planted in early April in this climatic zone, but your main plantings should come later.

For early crops such things as cabbage and broccoli should be started indoors, or in a coldframe or hotbed; or you can buy the plants. For midseason and late crops, however, it is perfectly good practice to start plants of cabbage, broccoli, Brussels sprouts, cauliflower, and, even, tomatoes in a garden row. Indeed, these plants that are grown in the open ground often show more vigor and come along faster than those pampered indoors, but they can never quite catch up with the early seedings. For early tomatoes, and every family wants them early, buy sturdy named plants from a reliable dealer or grower, if you do not have the facilities or the time to start your own. It is always a good idea to have several varieties of early, midseason and late types.

Annual flowers may be started now, indoors or outside, but, except for the very hardy kinds, it is advisable to postpone outdoor planting until soil and weather conditions are more favorable. Such rugged customers as annual poppies, cornflowers and cosmos may

The Victory Garden habit has now become a regular peacetime habit with many who enjoyed the fresh vegetables that were the product of their own labors, and who produced a variety of things on relatively small plots.

be seeded at almost any time, even in the fall. But the finer seeds, such as petunias, need a carefully prepared seed bed on which they are spread evenly and pressed into the soil with a board or the palm of your hand. Better do this indoors, or in a cold frame. Zinnias and marigolds like hot weather, too. It is easy to waste several dollars' worth of flower seeds if you are not careful about planting them.

April is the perfect time to transplant anything from a small rock plant to a full-grown tree. Of course, you cannot expect bloom from such hardy perennials as peonies and irises that are moved in the spring, or at least not normal bloom. But they can be safely moved now if you did not get around to it in the fall. When the ground is soft and moist and the nights cool, you can safely transplant almost anything, even old clumps of narcissus that have become too crowded to bloom. I am not implying that this is the perfect time to move everything. It is not. Some plants, including most evergreens, are happier if transplanted in the fall while they are dormant. But if you do not care to wait four or five months to lift them, do it now, making sure, of course, that the roots do not become dried out in the process. In this connection, it is well to remember that while you can move certain trees and shrubs, and the roots of iris and peonies, in a fairly dry state, you should never take chances with the evergreens, as their leaves are awake the year 'round. To permit their roots to dry out means almost certain death.

April is not too late to prune, although it is not the best time to do it. "Prune when the knife is sharp" is an old adage that is very true. However, while it is better to prune late than not at all, except for dead wood and small branches you will do better to do the heavy pruning when the sap is not flowing; excepting, of course, such hedges as must be kept trimmed during the growing season, whether deciduous or evergreen. Some gardeners like to wait until freezing weather is over to prune back roses and vines so that all the danger of winter-killing is past. But do not delay until the new growth has started, as pruning after that wastes the vital energy of the plant, and may also destroy the new buds that are starting to grow.

A dormant spray should be applied to insect-infested trees and shrubs just before the buds appear. Usually this is a miscible oil spray or emulsion. Not only are scale insects killed, but also egg masses and insects hiding under the bark and in cocoons. Thin-barked trees, such as the sugar maple, Japanese maple and the magnolia, may be harmed by a miscible oil spray, so some other type of spray should be used. Among the evergreens only the spruces and pines can safely be sprayed with a miscible oil, and then only before new growth appears and in solution weaker than for other shade trees. The recommended practice for firs, yews, hemlocks and retinisporas is that a nicotine solution be applied later in the season when the young insects have emerged and are crawling. Otherwise, strong spray solutions may injure the foliage.

As this is being written we are enjoying an unseasonably warm spell, which makes one wonder if we are to have another early spring. And that suggests the thought that the ground should be spaded just as soon as it is dry enough to crumble nicely. Good farmers often do early plowing during a winter thaw. It gets the work done, and such freezing as occurs afterwards will tend to put the soil in fine condition to work later on. Early plowing or spading also helps to control insects and weeds. It is hardly necessary to point out that before land is spaded or plowed it is advisable to remove stones and crop remains that are too difficult to turn under, or that may harbor harmful insects or the spores of plant diseases. Corn stalks may be turned under safely without danger of the European corn borer emerging, but these must be carefully buried under several inches of soil. Since this is not easy to do with a spade, many gardeners, including the writer, prefer to burn borer-infested corn stalks. This involves the destruction of valuable nitrogen and humus, but the lime, phosphorus and other minerals revert to the soil. To make such a choice now and then in gardening is to avoid the greater of two evils.

As to humus, if you have a compost pile you can easily replace the vegetable matter lost in the cultivated part of the garden by saving and rotting down leaves, grass clippings and the tops of vegetables and other plants. Add some manure if you can get it, and some lime and chemical plant food, and you will have a valuable "artificial manure" that is full of both organic matter and the elements essential to the healthy growth of plants. If you have followed the wise practice of planting rye, or some other cover crop, in the fall, this must be turned under before the spring growth becomes too rank to handle easily. Otherwise it will be a nuisance and will bother you in spading and in the planting of your crops. Also, too rank a growth will not rot down properly, creating a layer of plant residues under the soil that will hinder rather than help plant growth.

April is the best of the spring months to make or reseed an old lawn. The earlier the better, since grass will grow before the weeds make a start. April showers and warm sun and cool nights provide ideal conditions for the germination and growth of lawn seeds. Fill in the ruts and wheel tracks with fresh top soil, scarify the bare spots with a sharp rake, and reseed with a good lawn grass mixture containing a little white Dutch clover. Spread a generous application of a good complete plant food on the lawn and roll it smooth with a heavy roller, when the ground is soft but *not* wet and soggy. You may or may not need lime on lawn and garden. Only a test will determine that accurately, but, if you limed generously the year before, you can probably (Continued on page 218)

PHOTOGRAPH BY DR. S. S. WILKES

Without any particular reluctance the mother collie added the orphaned fawn to her brood and kept it well fed until it was able to find its food elsewhere.

A Strange Mother

By C. E. CHAMBERLIN

ONE Sunday morning during the early part of the summer, Weldon Schlameus, painter and general utility man of the College at San Marcos, Texas, took a little stroll out through his wood pasture. His small ranch, which is located about eight miles below town, is rough brush country, and is home to some small animals and a few deer.

Following a small gulch about one hundred yards from the highway, Mr. Schlameus heard the faint bleating of a fawn. As he approached a thick, live-oak hillock, he found the youngster near its dead mother. No doubt, the doe had been shot by a law-breaker who was headlighting from the highway, and the animal had run back into the brush and died from its wound.

Gathering the orphan in his arms, Mr. Schlameus carried it to his home, where the family collie had a litter of small pups. Wondering what the little fawn's reception would be, Schlameus held the old dog while his son showed the little deer where to get its dinner. The fawn got the idea immediately and went to work. The mother dog accepted the stranger without much question, and it grew up with the pups, ate with them, played with them, and always slept near them.

This little deer grew to be a fine spike buck. Although still a pet, playing with the children and the young dogs, each day it wandered farther and farther into the woods. Eventually it joined its wild kindred, reverting to its former wild state, and losing its habits as a pet.

Such instances show that the motherhood instinct in animals is closely related to animal friendships and companionships, as was brought out in the interesting article in the January, 1945, issue of *Nature Magazine,* by J. Frank Dobie.

The accompaning picture shows how strong is the trait of motherhood in this collie dog. Most collies are good hunting dogs. Ordinarily, this mother dog would chase such a fawn and probably would not hesitate to kill it if it were caught. Instead, however, she mothered it along with her puppies.

I have seen a number of these strange companionships. My father once had a ton Percheron stallion

who had as his pal one of my mother's old Dominique roosters. The rooster was a constant companion of the horse, and liked nothing better than to perch upon his broad back. I have seen a mother cat nursing a young squirrel. One of our ranchmen, near San Marcos, has an old bulldog, an old Mexican ram, and an old buck deer, all close friends and together constantly. The old bulldog will allow no danger to come near his pals.

There is an authentic case of a razorback pig in Mississippi that ran with a pack of hounds after foxes and coons, and seemed to think he was a very good "coon dog." Bill Kuykendall, a ranchman and polo player of near Buda, Texas, has some pet deer that romp and play with his big half-Dane hound.

It seems to me that the Almighty, in His all-wise creation, gave to all of us, both human and animal, a certain degree of motherhood instinct. Most of us like to "mother" the little woolly puppy, the fluffy little duckling, the kitten, or almost any other young thing. We will pick them up, feed them, and give them a warm bed, even though they be worthless, a nuisance, and we know well that sooner or later we shall have to dispose of them in one way or another.

Flowering Witch-Hazel

By HILDRETH M. ALLISON

When autumn leaves have danced their final fling
And withered lie in faded russet heaps,
When chilling Winter's caustic hours bring
The unrelenting wind that nips and sweeps:
Her tiny gemmules then appear,
Bright blooms to hearten and to cheer.

Much as the deft apothecary's art
Extracts emollient from her kindly wood,
Soothing the bruise, allaying sting and smart,
So work her witchly yellow blossoms good:
An unctuous balm therein we find
For tired soul and troubled mind.

Purple Loosestrife

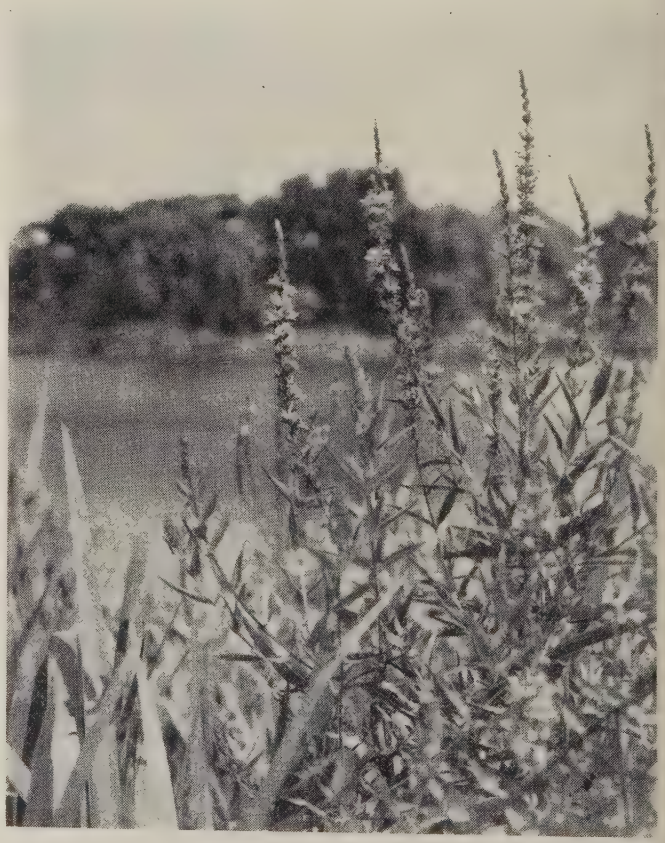
By EDWIN F. STEFFEK

WHILE not a native, the purple loosestrife, *Lythrum salicaria,* is a good plant to naturalize along streams, ponds or other other bodies of water, especially where the competition is severe and less aggressive plants would be crowded out. Its flowering season is July and August, and it may be seen in many parts of the East, where it has made itself at home, especially along the Hudson River from Albany down.

This plant is a perennial, growing four to six feet tall and producing graceful spikes of cheerful, reddish-purple flowers over a long period. It revels in rich, moist soil in full sun or partial shade, and is an excellent companion for the turtlehead, marsh mallow and narrow-leaved cattail. However, one should not make the mistake of planting it with weak-growing plants, which it might crowd out. The leaves are narrow, opposite or in threes, and a pleasing deep green.

This loosestrife may also be grown in flower borders and other drier places, where it is smaller and not so rampant. For those who wish, there is also a rosy form, *L. s. roseum,* which is obtainable from a few nurserymen.

Propagation is easy. Loosestrife may be grown from seeds, which are produced plentifully in more or less cylindrical pods in late fall. The planting may be done at once, or the following spring. Germination takes place in a short time, and the plants if



successful will usually flower by the second year.

This plant may also be grown from cuttings taken during the summer and placed in moist sand, or by division of the roots in the spring or late fall. When once established, the plants are very hardy and one need have little worry about treating them too roughly. Water standing over or around the plants in winter has no harmful effect on their prospects.

Planting What Grows Naturally

By ROBERT C. BAUR

Illustrations by William H. Bodge

Butterflies enjoy visiting the plants planted by Nature just as much as they do those of tamer variety, perhaps even more, who can say for certain?

WOULD you plant orchids above the Arctic Circle, or plant an aquatic garden in sunbaked Death Valley? It sounds ridiculous, yet we expect our gardens to flower freely, with seeds, roots and bulbs from the far corners of the earth. Out of this varied assortment of plants, whose native haunts range from steaming jungle to snow-covered alp, a season of colorful bloom is anticipated, regardless of whether soil or climatic conditions are suited to all their particular requirements.

The success of the flower garden rests largely upon the perseverance of the individual and the cooperation of the weatherman. Also to be considered are the numerous insects that seem to share the opinion that the garden has been planted expressly for their recreation and lusty appetites. Regardless of unseasonable weather and invasion by the insect hordes, the native flowers of field and wood glorify the wayside from spring until long after the killing frosts. Your backyard, through little effort, can join that procession of color. As for transplanting, watering and cultivating, you simply do not. Just relax and enjoy the flowers provided by the generosity of Nature's magical touch.

During the war, with several members of the family in the service and help impossible to obtain, our two acres in southern Connecticut grew rather wild. Nature wastes no time reclaiming that which was once hers when pressure is not applied to lawn-mower and spade. Great teeming cities are not immune to this recolonization movement, and a newly vacated lot is quickly covered with vegetation, for no environment appears too harsh for these wild things. In London a profusion of wild flowers sprang up in the gaping cellars and ragged crevices left by the blitz and robot bombs of a day now happily past.

Surveying in the spring our own hopeless tangle of what appeared to be weeds, it was no small surprise to discover that many grew into flowers more showy than the carefully planned beds of annuals. June brought on the oxeye daisies, appearing in clumps against a background of evergreens, and looking as if they had been placed there by some expert gardener. An overgrown iris bed produced a smiling carpet of black-eyed susans, intermingled with the deeper orange of the hawkweed. They were followed by an uninterrupted pageant of color that lasted throughout the summer.

The common milkweed, classified as one of our ordinary weeds, has been grown for years in English gardens. In recent years commercial value has been found in its sticky juice and fibrous stems. During the war the soft, downy floss, which wafts the seeds, umbrella-like, to their destinations, was in demand to replace unobtainable kapok for use as stuffing in life preservers. The flowers, hanging in clusters from the stem, are very delicate, shading from pale lavender to deep lilac.

Another interesting member of the milkweed family is the butterfly weed. Having little of the milky juice common to other members of the family, its brilliant orange flowers are a pleasure to behold.

The lush tropical growth of the poke or pigeon berry is an asset to any garden. Thriving in moist, shady places that are too dark and wet for other plants, its bushy stalks form an attractive background. The greenish-white flowers are followed by dark purple berries, from which the early settlers made ink and dye.

The aromatic bergamot or bee balm needs no in-

Bees go about their appointed task in the random garden with what appears to be just as much joy as in the tame surroundings of the carefully grown plot.

troduction, for it has been a favorite for generations. Grandmother's garden would not have been complete without its scarlet and lavender heads. Hardly a summer's afternoon passes without several visits from a hummingbird or butterfly.

Wherever the lawn had been neglected delicate Queen Anne's lace and fragrant evening primrose assured me there are other things nicer by far than a closely clipped turf.

Although not a native of the United States, the yellow and orange butter and eggs has become a naturalized citizen. Listed among our wild flowers, farmers call it a pest, for this European immigrant has spread like wild-fire. Growing everywhere in the poorest of soil, this tiny snap-dragon may be found blooming in November.

With summer drawing to a close, and the cricket orchestra in full swing, the swamps and boggy meadows blaze with purple joe-pye weed. Multiplying rapidly, this plant likes wet feet and may be propagated easily from seed.

Of the hundred or so classified species of goldenrod, about eighty belong to the United States, forty of which may be found growing in the northeastern states. The clan was well represented on our place, and, together with the asters, they kept me busy trying to identify them. Well-trained botanists are often daunted by the far-reaching aster family, which exceeds the goldenrods in membership. A thicket filled with heart-leaved aster and New England aster is stiff competition for a chrysanthemum-filled garden.

Wild flowers are their loveliest when viewed growing in their native haunts. They are a national heritage to be preserved for future generations, and should never be picked or dug thoughtlessly. Many species that once grew in abundance are rapidly becoming rare because of the expansion of our cities and carelessness of would-be outdoor lovers. The increasing number of automobiles on the highways has caused great inroads into our flowering shrubs and plants. No country lane is now remote to the average city dweller, who is in most cases ignorant of the various species of plant-life and how plentiful they are. There is little harm, however, in picking seed from the abundant field flowers and scattering them to be enjoyed around the house. Let these plants form a pleasing cover for those unsightly places where nothing else will grow. One's compost heap, long an eyesore, can be neatly camouflaged behind a lofty screen of poke. The brush-pile the next-door neighbor throws at the edge of the lot can be concealed from view by a stand of goldenrod. By no means do these native flowers have to be sown without plan, for they may be planted in as formal a pattern as may be desired. If you like flowers, but shudder at the sight of a garden gadget as if it were an instrument of death, or claim you just have not the proverbial green finger, simply broadcast a few of these seeds in the spring and fall. Your garden cannot go wrong if you let Nature have a free hand.

The common milkweed is classed as one of our ordinary weeds, yet it has been grown for years in English gardens. Recently it has been found to be commercially valuable.

Monks of the Woods

By GRACE V. SHARRITT

Photograph by John Lindsey Blackford

THE AFTERNOON was cold; the wind, sinister. Ice still covered the streams as though reluctant to admit, even beneath a coquettish sun, that within another month spring beauties would bedeck these very banks.

Yet all around the open woodland there were signs and portents of ecstatic spring hours ahead. Violets were green under their warm brown fluffs of oak leaves. Tree boughs blushed crimson at every bend in the path, and birds called to one another throughout the grove.

Even in March bird-calls can be distracting. And those that teased and beckoned this chilly day were the lisping sweet notes of brown creepers. Like subdued music of the pre-Easter cantata of the woodlands, they made Lenten plaint to a later Alleluia.

True to his character of somber dress and habits, this small fellow's chantry was typical of his personality. Sweet little lisping notes floated from tree trunks like soft *vox humana* trills from a celestial organ.

Never before had I seen or heard a flock of brown creepers in migration. In winter, when I searched and searched for just one glimpse of this diligent worker, and felt a day golden indeed when my patient watch was rewarded by a lone bird making a tour of a leafless tree, this sudden flight of brown-winged vocalists was a veritable spilled treasure.

Brown creepers are with us all the year. Their genus is *Certhia,* and they inhabit wooded areas throughout much of North America. The eastern race has his counterpart in the Rocky Mountains, living from southern Alaska south to Arizona and New Mexico. The creepers ignore the areas of dwarfed trees of sub-arctic and alpine heights.

Three other members of this same North American family differ little in characteristics and dress from the Mexican creeper, which inhabits the Mexican mountains and ventures as far north as Arizona, and the California Creeper, which circles the tree trunks of the Pacific coast from Santa Cruz Mountains to southern Alaska. Tucked in between these areas is the dainty Sierra creeper, which gladdens the hearts of folks from the Cascade Mountains to the Sierra and down to the San Jacinto Mountains.

Cousin to the nuthatches, the brown creeper, with his slender curved bill and stout tail, his perfect camouflage when on brown tree trunks, requires a keen eye to be distinguished from his dining-table. Yet even the novice cannot confuse this bird with

any other in North America that patrols the tree bolls. Most of them are stouter, and hop in their search for food.

Monks of the woods, I call these birds, for rarely do I see them in the rollicking company of cardinals or bluejays in the same woodsy neighborhood. There is something about their quiet, undemanding manners that provokes thought and contentment. One feels better for having met this little undemonstrative fellow on a wintry walk. For he is associated with solitude, deep breaths of fragrant earth scents, and lovely silences.

"Solitude," wrote James Russell Lowell, "is as needfull to the imagination as society is wholesome to the character." This sums up the brown creepers for me. Especially so on a cool March day when their sweet lament is fitting to the time and the season.

For were not the little monks of the woods playing the pre-Easter organ notes to the big spring parade of joyous song and more colorful feathers?

The Wakon Bird

By W. L. McATEE

Of the mythological birds of the North American Indians, one, I believe, can be identified, at least in a late embodiment. The steps by which I have arrived at this conclusion are here set forth.

First, it is known that extensive commerce prevailed among the aborigines. In mounds of the northern Mississippi Valley area, here concerned, have been found products that could have come only from the Atlantic and Pacific coasts. Such a radius of trade is ample to cover the transfer from southern Mexico and Central America of specimens which at the northern end of their journey may have come to symbolize the wakon bird.

Second, feathers entered very largely into Indian ornamentation and magic, hence undoubtedly were handled in their commerce. Heads and even bills of birds were sent long distances. Catesby, 1731, informs us that the Canadian Indians highly valued bills of the ivory-billed woodpecker, a bird ranging no farther north in the East than the Carolinas of which he wrote. The Canada redskins used these bills in coronets for their great men and sometimes paid as much as three buck-skins for a single bill. One of these ivory-beaks has been found in an Indian grave in Colorado, a locality also well removed from the known range of the species.

Bird remains certainly traveled, and among them what appear to me to have been those accepted as satisfactory representations of the wakon bird. Wakonda among the Indians of the northern Mississippi Valley, the power animating all natural forms, was frequently addressed in supplications and rituals. According to Jonathan Carver, 1779, the wakon bird was known to the Indians of what is now Minnesota as the bird of the Great Spirit. "I never saw one of these birds," he says, but he gives a description, gathered from the Indians, in which this salient passage occurs: "its tail is composed of four or five feathers, which are three times as long as its body, and which are beautifully shaded with green and purple." Considering that a skin prepared for trade would be shrunk, the proportion mentioned would not be out-of-the-way for the quetzal, which, moreover, is the only North American bird having tail feathers at all corresponding with Carver's description.

The quetzal, national emblem of Guatemala, is familiar to stamp collectors through its frequent representation on the postal issues of that country. I am the more inclined to identify wakon with quetzal by Alexander Skutch's remark on the latter bird, "Its plumes were used for personal adornment by Indian royalty and nobility in pre-Columbian times." It was worshipped by the Aztecs and Mayas and its sacred significance may well have passed along with its skin through the channels of Indian commerce. Doubtless the myth of the wakon bird existed before any trade-skin of a quetzal had arrived, but when it came, more gorgeously colored than any bird previously known to the northern Indians, it was recognized as a fitting embodiment of the revered bird of the Great Spirit.

Shaped Like a ___?___

By MABEL IRENE HUGGINS

Many adjectives tell the shapes of things. Such adjectives are often applicable to parts of plants, though there are exceptions. In the following list there are twenty-six of these "shapely" words. Can you match them with their definitions in the second column? Fifteen correct will be good; twenty, excellent, and all would entitle you to some sort of botanical medal. Answers are on page 218.

1. cornute	a. club-shaped
2. flabellate	b. bell-shaped
3. cordate	c. cross-shaped
4. peltate	d. hood-shaped
5. ovoid	e. spindle-shaped
6. clavate	f. top-shaped
7. stellate	g. fiddle-shaped
8. navicular	h. shield-shaped
9. campanulate	i. head-shaped
10. reniform	j. lance-shaped
11. cucullate	k. fan-shaped
12. filiform	l. pear-shaped
13. turbinate	m. spear-shaped
14. subulate	n. egg-shaped
15. hastate	o. boat-shaped
16. falcate	p. thread-shaped
17. cuneate	q. star-shaped
18. lanceolate	r. bag-shaped
19. pandurate	s. kidney-shaped
20. cruciform	t. horn-shaped
21. pyriform	u. tooth-shaped
22. sagittate	v. wedge-shaped
23. saccate	w. awl-shaped
24. fusiform	x. arrowhead-shaped
25. capitate	y. sickle-shaped
26. dentiform	z. heart-shaped

To use this map hold it before you in a vertical position and turn it until the direction of the compass that you wish to face is at the bottom. Then, below the center of the map, which is the point overhead, will be seen the constellations visible in that part of the heavens. It will not be necessary to turn the map if the direction faced is south.

The Navigational Stars

By ISABEL M. LEWIS

THE NAVIGATOR, whether he is steering the course of a ship at sea or a plane through the sky, may depend at times entirely upon his knowledge of the positions of a few select stars. These may be called navigational stars because they are so constantly used for this purpose. The navigator will also rely on the position of the sun, moon, and, whenever available, one or more of the four planets, Venus, Mars, Jupiter, and Saturn. Although many aids to navigation have been developed in the past few years, celestial navigation is, under certain circumstances, more valuable and dependable than any other method.

In its record-breaking flight of 11,250 miles from Australia to Ohio, the naval plane Truculent Turtle discarded all of its loran and radar equipment, weighing more than a ton, so that additional gasoline might be carried, and depended upon celestial navigation alone to steer an unerring course. The superfort Dreamboat, in its flight of 10,300 miles from Hawaii to Egypt, did likewise. In polar flights celestial navigation is exceptionally valuable because of the crippling effect upon the magnetic compass and radar of nearness to the magnetic pole and unpredictable magnetic disturbances.

There are, in all, about fifty-five stars that are, with the exception of one third-magnitude star, of first or second magnitude or brighter, and which may be called navigational stars since they are used repeatedly for the determination of position. These stars are widely distributed over the heavens. Twenty-eight of them lie south of the celestial equator, twenty-seven of them north of it. They include all of the twenty brightest stars in the heavens, and, in addition, many conspicuous stars of second magnitude. There are, of course, navigational star charts that

give, in addition, the positions of many other bright stars of third magnitude, and a few even of fourth magnitude when they are in a region of few bright stars, or outline some distinctive grouping of stars that is easily recognized, such as The Hyades, Pleiades, or The Dolphin, known also as Job's Coffin.

The most noted of all the navigational stars is The Pole-star, North Star, or Polaris, as it is variously called. Its unusual position within approximately one degree of the north pole and nearly in line with Alpha and Beta in Ursa Major, or Dubhe and Merak, known as The Pointers, makes it one of the easiest of all stars to locate. It is slightly fainter than a standard second magnitude star. In addition to indicating the position of true north, it is valuable for determining the latitude of the observer, which is equal to the altitude of the pole above the horizon. Special tables are given in the American Nautical Almanac for this purpose. Since the north pole lies on the horizon at the equator, and is invisible in the southern hemisphere, the Southern Cross has there taken its place in importance. As it happens, when the Cross transits the meridian, its upright lies in a nearly north-south direction, and, at other times, the amount by which it is inclined to the meridian roughly indicates the time. For this reason the Southern Cross is sometimes known south of the equator as the Celestial Timepiece.

Although any star may be used to determine an observer's position—if the star has been identified and its position is given, it is usually only the brightest and most easily identified stars that are used in navigation. In fact, one will find that the positions of only fifty-five stars are given in the American Nautical Almanac, in addition to the positions of the sun, and moon, and the planets Venus, Mars, Jupiter, and Saturn. A navigational star chart gives, however, in the same volume, approximate positions of more than two hundred of the brightest stars. The Air Almanacs give, in addition to the same Navigational Star Chart, useful Sky Diagrams, which indicate the positions of the sun, moon and bright planets, and twenty-two navigational stars for certain latitudes and times.

It is often of great importance to be able to recognize a bright star or planet at a glance and beyond any question of its identity. An observation is useless unless the object is correctly identified, and there are times when the star appears suddenly through a rift in clouds and its identity is uncertain. An acquaintance with the stars, their colors, and position with respect to some other near-by star, if such is visible, may settle the question of identity. Vega and Capella are two stars that are frequently used in navigation. These stars are so distinctive in color and brightness that one should never have much trouble in recognizing them, especially as in each case there are near-by stars with which each forms an unusual configuration. Vega forms, with two faint stars close by, a small triangle with sides of equal length. This, in a clear, dark sky, will be easily observable, while Capella, as remarkable for its golden-yellow color as Vega is for its diamond-like brilliancy, is associated with the small triangle of faint stars close by, known as The Kids. Many other bright stars are in easily identified configurations. Altair, in the same general part of the heavens as Vega, and very similar to it in color, is much less brilliant and is flanked on either side by a fainter star in line with it, and at nearly equal distances from it.

Deneb Cygni is also in the same general region of the sky as Vega and Altair, similar in color, and somewhat less brilliant than Altair. Its position at the top of the Northern Cross is easily recognized, and no faint stars are associated with it as in the case of Vega and Altair.

Aldebaran should be quickly identified from its position in the V of the Hyades, and its color also is unusual, a decided reddish. There are times when the planet Mars might be mistaken for Aldebaran, as well as for Antares, the first magnitude star in Scorpio, for the three are similar in color. As both Taurus and Scorpio are zodiacal constellations there are times when Mars passes through both of them. The word Antares means "Rival of Mars," and there are occasions when the resemblance of the two, as seen with the naked eye, is remarkable, although a glance through a small telescope will settle the question definitely, as the planets show disks when viewed through even the smallest telescopes, while the stars, due to their far greater distance, appear as sharp points of light.

In certain parts of the heavens there is a dearth of bright stars. There is no star as bright as even third magnitude within more than ten degrees of the south pole of the heavens. The third magnitude star, Acamar, in the southern hemisphere, in Eridanus, has no bright star within a considerable distance of it, and is, itself, the faintest (Continued on page 218)

Family Forum

By COSETTE MIDDLETON

Grandfather, musing on the cosmic vault,
Waxes prophetic in a somber voice:
"War springs from astral restlessness. The fault
Lies with the stars. We mortals have no choice."
Father adjusts his telescope and scans
The sky, recalling data learned in college.
Mother consults her horoscope and plans
A cautious week-end, sobered by new knowledge.
But Junior, twelve, pursues another pattern,
Argues the density of Jupiter,
Gives four moons to Uranus, nine to Saturn,
And flaunts his prowess as astronomer,
While Jane, just seventeen, looks up and sighs,
And all of heaven sparkles in her eyes.

The School Page

By E. LAURENCE PALMER

Professor of Rural Education, Cornell University, and Director of Nature Education, The American Nature Association

Are You a Wahbla?

One of the reasons why war may again scourge the earth is that human beings do not have a universal language and cannot as yet completely understand each other. If we spoke Russian, or the Russians spoke English, I should not worry much about the future of the war-god Mars. I rather think he would have taken his final nose-dive. But there are minor differences of misunderstandings, too. Some years ago Dr. Malvina Trussell of one of the teachers' colleges in Georgia asked me something about the "wahblas" of the vicinity of Ithaca. At first, I had not the slightest idea what she meant. Then, I remembered that a translation of that into New Englandese would make it more like "wawblas", which might even approach good upstate New York "warr-blerrs."

No matter how you spell it or pronounce it, the dictionary will consider these feathered mites as warblers, and no matter what our likes or dislikes may be in the North, South, East or West, it is hard to imagine anyone who cannot be better for even a passing acquaintance with the birds, as given emphasis in this month's special insert.

A few months ago we devoted this page to comment on an editorial that ascribed certain human qualities to sparrows and doves, and in a most absurd way. At the risk of exposing myself to the very criticism I made of others, I venture to ask you to compare any warbler you may see, diligently making its own living in any tree this spring or summer, with the average old hen whose food and lodging are supplied her by others, and who now and then makes a few desultory scratches and a bored cluck that indicate that she could work, if she had to, and might even cackle. There is an obvious verve for living that sparkles in the eyes of every warbler, such as I never saw pictured as gleaming from beneath the brows of John L. Lewis, or any other of the champions of work stoppage, controlled production, extra portal to portal pay for changing your pants, and uniform pay for groups of human beings obviously of varied abilities, ambitions and drive.

Will to Work

I rather think that the feature I have most liked about being a college professor is that no matter how hard I drive myself I always see how much better I could do if I drove myself a little harder, and so have set out to do just that. No one says this must be done. I could sit back and take it easy, and regret that some baseball player makes more than I do. I might even join an association for the protection of the rights of college professors and let someone else fight my battles for me. Frankly, I never have joined such an organization and never expect to do so. I prefer to be some kind of warbler, and to give the opportunity of the moment "the works" so far as I am able, trusting that it will be recognized for what it is worth, and that work reasonably well done will provide ample opportunity for further work to be done equally well. Somehow I cannot imagine the most hard-hearted commercial manufacturer firing any employee who, by diligence, superior ability and other good qualities, is a better producer than his fellows. It does not make economic or any other kind of sense to do so.

Also, this business of trying to reduce us all to generic status, to make us all just teachers, or miners or salesmen or auto mechanics, is ridiculous. All warblers are not alike and never will be, and if you have thought of them as being alike, then you should make the most of the opportunities presented you next month and see how wrong you are.

Studying Warblers

Here are a few suggestions that may help you. You don't even have to know one warbler from another to do what I suggest. All I ask is that you provide yourself with a pair of field glasses, or just use your ordinarily good eyes as I do. For best results, go out into some woodland, preferably on a hillside, where you can sit on the ground and look off into adjacent tree-tops. See what happens. Opportunity may present you with a little black and white streaked bird that moves about avidly over the tree trunks. You probably know enough about birds to know that it is not a nuthatch. Well, since it is black and white and creeps around the trees, make up your own name. It will be no better than the real name of black and white warbler, or black and white creeping warbler. Then, suddenly your attention is attracted by a burst of song from the tree tops. You look and there is what seems to be a clean, yellow bird singing as though his heart would break. You need not be surprised when you look in your book to find that this is known as a yellow warbler, because that is what it is. That name is as good as any you might suggest, I am sure. See if you can ever catch a black and white warbler singing the way a yellow warbler does, active in the same way or working on the same part of the tree.

Take a look at a few of the common names suggested for the warblers to see how many of them are adequately descriptive, either of the place in which the birds are found or of the markings at least of the male. There are black-throated blues, black-throated greens, chestnutsides, bay-breasteds, orange-crowned, yellow-throated, black-polled, cerulean and golden-winged kinds. Even a political ward leader provided with a list of these names would have some idea of how these particular birds look, in spring at least. Then, there are such names as water-thrush, pine warbler and myrtle warbler that give some less valid suggestion for identification based on habitat rather than on coloration. This is much less satisfactory for the beginner because few of us who know myrtle warblers will ever have a chance to see one gorging himself on myrtle fruits, and if we waited to find a myrtle bush in our neighborhood we would miss the whole gorgeous show these birds put on for our benefit every spring.

I think that one of the first things about studying these birds is the recognition of the relatively restricted fields in which each kind chooses to work or to play. Make yourself reasonably well informed on the jobs undertaken, without bosses, by the different warblers of your neighborhood that can be recognized by their descriptive names alone. I am reasonably sure that you will then have made sufficient of a start to want to go the rest of the way. You will learn about those that, for some obscure and certainly functionless reason, must go indefinitely through life bearing the name of some ornithologist who may have happened to be among the first to recognize the often minor character that makes it a distinct species.

Warbler Habits

Should opportunity present itself, you might learn that not only do the different warblers work in relatively limited areas, but they tend to nest in even more restricted areas. The intricate interrelationships represented by these birds offer one of the most intriguing of all studies of Nature. One thing such study establishes is that there is no such thing as a warbler or a wahbla. There are definite kinds of warblers, and they do definite jobs in their own definite ways suitable to their specific abilities.

Such a study may make you wonder if the founding fathers did not slip a little when they suggested that all men were created equal. It is perfectly obvious that they are not. If they were, I could sing like Sinatra, an ambition I have never had. If it were so, we would have no track meets, because all candidates would have equal ability (Continued on page 218)

Camera Trails

By EDNA and BILL EVANS

"THE flowers that bloom in the spring, tra-la-la," etc. We all love them, watch for them, and beam at them happily when they appear. And, with April on the calendar and spring in the air, they should be beginning to put in an appearance about now in places where Old Man Winter is getting ready to close up his ice factory for another season.

But, in spite of the eagerness with which we look for them and the joy with which we greet their appearance, those spring flowers can be a real pain in the neck for Nature photographers.

B. W. Higinbotham, a "Camera Trails" reader who lives in Mishawaka, Indiana, has outlined the situation most aptly in making a suggestion as to topics she would like to see discussed in this photography section.

"What do you do," she writes, "when you want a photo of a rare (remember it's very rare and cannot be moved) wildflower that is photogenic from only one angle, and that resides in a woods speckled with bright spots of sunlight for a background? Meanwhile, the photographer is so loaded down with lunch, tripod, camera, *Gray's Manual,* etc., that she cannot carry an artificial background."

Now there you have a real problem—one that every Nature photographer will recognize. Sometimes, when we are tramping through the woods, loaded down with every sort of camera equipment that we can hang, tie or otherwise attach to ourselves, we wonder whether there is not something we could leave at home. But there is not. Nothing Reader Higinbotham has listed is expendable—in fact, we can think of a number of "musts" that she forgot to mention.

But the background business is exasperating, and flowers have a habit of growing in places that tax the ingenuity of any photographer. How are we going to take that picture for our Indiana friend without adding another milligram to the amount of things she has to carry?

Probably she has a handkerchief in her pocket, and if her flower is of a color that will show up against a white background, she can rig up a handkerchief backdrop on a couple of sticks. Back far enough from the flower so that it is out of focus, this should serve well in some cases. If the flower happens to be white, a khaki colored handkerchief might do the trick, if she happens to have one along.

In fact, if she is interested, she might tint a few handkerchiefs to use especially for backgrounds. Of course this means more to carry—but not much.

Water lilies will show up well against their natural backgrounds, providing there is no light reflected from the water into the camera.

A friend of ours has tried this tinting idea, not with handkerchiefs but with old window shades. He took some old shades that had outlived their usefulness in the dining room and painted them various colors. Being interested primarily in obtaining color slides, he tried different colored backgrounds with flowers of different hues. He found that a medium blue was the best background for red and lavender flowers; yellow was best for blue flowers, while green foliage made the best showing against an orange background. The window shade idea worked well because, when not in use, the shades could be rolled up and carried easily, or stored in a minimum of space.

But we are not suggesting that Mrs. Higinbotham carry a couple of window shades into the woods. A handkerchief or two should be sufficient in most cases. When a really dark background is needed, a couple of out-of-focus trouser legs (with wearer inside) will sometimes do the trick.

Now as to the patches of bright sunlight and dim shadows that one finds in a spring woodland—here is a real problem. Unlike Joshua, we cannot command the sun to stand still. Nor can we shift it to the right or left, and we do not intend to chop down any trees so as to let in more light. The situation is such that we must either take our picture with the light as-is, or we will not get any picture at all. We have had to pass up a number of pictures for that reason; we especially wanted a picture of a tagua nut palm in South America last summer but we never could get one because the jungle light was dim.

We do have one possible suggestion, but it would mean adding a little more to the load that Friend Higinbotham is already carrying. A mirror helps sometimes to catch and reflect light on the subject you wish to photograph. Our friend of the window shades holds one in his hand while taking his flower pictures—his camera is mounted on a tripod, of course.

Our Mishawaka reader being a woman, probably has a compact with her as a matter of course. A man might tuck a small mirror in his pocket—or else borrow his wife's, in case she accompanies him on the

The waxen petals of magnolia blossoms stand out well against the deep, glossy green of their leaves.

A strip of white cloth, held back of a plant that blends too much into its surroundings, will make it stand out sharply as a silhouette. When the picture is printed the non-essential material, shown here at the sides, can be removed.

flower photographing jaunt.

Nature photography is not easy. It means taking things as they are, without much chance for stage setting and the arrangement of properties. There are no flood lights in the forest, no clear, open, convenient stage on which to arrange the picture subjects. Nature has already arranged them, and often in such a way as to make them purposely inconspicuous. If every picture was easy, if every setting was made to order, if every shot came out perfectly—would success mean so much? We do not think so.

There is no doubt about it, plant photography poses some difficult problems. Of course, a plant will not fly away just before you are ready to take a picture, as so many bird subjects will. Nor will a plant show any objections to having its picture taken, as do some of the larger animals. The problems a plant poses are picking it out of its background, getting it all in focus, having the light right and assuring proper color and texture rendition on the film.

Some flowers stand out better than others against their backgrounds. The waxen petals of magnolia blossoms make a fine contrast against the deep, glossy green of their leaves. Water lilies, too, photograph well against their natural backgrounds, providing there is no light reflected from the water into the camera.

On the other hand, some flowers blend so well into their backgrounds that it is necessary to isolate them in order to get a picture at all. To do this we often use a strip of white cloth, held back of the plant so that it stands out sharply as a silhouette. In printing, then, the non-essential material can be removed.

We hope we have given Reader Higinbotham some assistance—at least we have not burdened her with any sort of Rube Goldberg gadgets to carry into the woods with her. There just is not any one foolproof answer to his question. Nature photography does not work that way.

THE FIRST MILESTONE

With this issue of *Nature Magazine* we pass our first milestone. In other words, "Camera Trails" has been under Evans management for a year now, with our first section appearing in April of 1946. Looking back, it has not seemed long, and we hope our readers have found as much pleasure in the camera articles as we have. We have learned a lot in producing the articles—and we hope they have, in turn, been helpful to others.

The year has brought many changes. Twelve months ago new cameras were still well-nigh impossible to get. They are not exactly plentiful, even now, but many new ones are on the market.

Some types of film are still hard to get—or rather, the dealers are not sure of a full supply at all times. Film packs, especially, are hard to come by, while the photographer who insists on a specific make and speed of film may not always get what he wants. The flash bulb situation, too, is not what it might be.

Still, the picture is a lot brighter now than it was a year ago, and perhaps, before another year rolls around, there will be plenty of everything for everybody.

FROM THE MAILBOX

The mail from camera companies has not been very heavy this month; in fact, it has been definitely on the light side. Probably the reason for this is that camera and film supply companies are taking a breather after the intense activity that preceded the Christmas season. At that time nearly every mail brought the report of some new camera, photographic gadget, or film. Also, since this April section is being prepared some weeks in advance of its publication date, manufacturers are not yet ready for the "vacation trade."

However, Eastman Kodak Company has issued three new data folders that should be of interest to some readers. Their titles are "Sunsets in Color," "The Paper Negative" and "Adding Titles to Photographic Prints"; the latter is designed mainly for commercial photographers. All three may be obtained free from the Sales Service Division, Eastman Kodak Company, Rochester 4, N. Y. Mention "Camera Trails" when you write for your copies.

Also, the Kalart Company continues to turn out more speed flash attachments for various makes of cameras. The newest, called the Kalart Compak, is designed for the Kodak Bantam camera. The whole outfit is termed handy, convenient and small enough to fit in your pocket.

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From time to time the American Nature Study Society will present descriptions of particularly effective programs and activities being carried on by individuals or institutions, and which might serve as a model for similar work elsewhere. For further information, and copies of the program of "Expeditions for Everyone", described this month, write to Mr. Charles E. Mohr, Director of Education, the Academy of Natural Sciences, 19 & the Parkway, Philadelphia 3, Pa.

EXPEDITIONS FOR EVERYONE

It was 7:30 P.M. on a late March night as 70 persons lined up along the rail of the big concrete bridge over Pennypack Creek, in Philadelphia.

"Listen," called their leader, and, as a hush fell over the crowd, a continuous musical chorus could be heard in the distance. "It sounds like sleighbells," someone thought. "Where is it coming from?" asked another.

"Dismal Swamp is down there in the woods," explained the leader. "We're going down to see what is making all that racket. Keep in single file and move quietly. Let's go!"

The light-bearing procession descended quickly from the bridge approach, and snaked off through the woods, the points of lights bobbing and twinkling. They swung off to the left, then came almost to a stop. The explorers had reached swampy ground and circled cautiously around it. About half the group wore galoshes or hip boots.

The bell-like sounds slackened, then increased. At close range they became more distinct, two-syllable notes, a piping *Knee-deep, knee-deep.* Hanging a gasoline lantern to a tree at the swamp's edge to give everyone a bearing, the leader pointed to clumps of leafless bushes scattered around the swamp, a few yards from shore. "There's where the peepers are," he said. "When you find them, watch to see how they do their singing."

Wading out into 40° water, some without benefit of boots, were dozens of eager amateur naturalists—students, office workers, teachers, housewives, ex-G.I.'s and professional people. They had joined this Expedition for Everyone to witness one of Nature's strange phenomena, the annual spring excursion of frogs to ponds where they can mate and lay their eggs.

"Look what we have", someone shouted from a circle of excited frog hunters: They had captured a painted turtle, rudely awakened from his winter-long sleep in the mud at the bottom of the pond. But the search for the peepers continued. When the explorers made a noisy approach to a clump of bushes, the peeping stopped, but soon resumed if everyone remained quiet.

"Try imitating their whistle", suggested the leader, pursing his lips and producing a call good enough to get an immediate response, only a few feet away.

Expeditioners looking, and, right, what they are looking for.

"There it is! Why it's a baby frog!" Others crowded closer. "No", a biology student corrected him, "a baby frog is a tadpole; this must be a full grown frog."

Despite its small size—less than an inch long—it was an adult spring peeper, one of our tiniest amphibians. Hundreds of the miniature tree frogs were seen, some of them with a great balloon-like swelling beneath their throats. It was from these air sacs that the peeps were coming—but only the male frogs were singing; the female frogs were silent.

The next day little frogs were peeping in many a Philadelphia classroom, and hundreds of pupils were hearing about another of the Academy of Natural Sciences' adventurous Expeditions for Everyone.

Begun in 1938, in answer to frequent requests for leadership for Nature walks from garden clubs, schools, and scout groups, the Academy now offers a year-round program of hikes for the general public. The trips are free, except for transportation. They differ from the trips of various Philadelphia hiking clubs in seldom being more than three miles long, and in always having the observation of some natural feature as the goal of the trip.

In spring and fall there are bird trips in the heart of Philadelphia, to little Rittenhouse Square where more than one hundred species of birds have been seen; to famous bird concentration points like Hawk Mountain, and the Witmer Stone Sanctuary at Cape May, New Jersey.

Crowds of 200 to 300 persons attend the Cape May trip, and a group of half a dozen or more leaders conduct smaller parties on side-trips to see marine life, wildflowers, and fossil shells. The spectacular hawk flights attract most attention, hundreds of accipiters, falcons, eagles, ospreys and marsh hawks passing overhead, and, on rare occasions, flocks of broad-winged hawks. As people line up along the highway, one of the leaders stands on a sound truck and calls attention to birds passing by overhead.

"Here comes a duck hawk, dead ahead over the tree tops," comes the call, alerting the crowd. "Look at those long, pointed wings. And behind it is a Coopers, see how it flaps, then glides; and notice the shorter, rounded wings." A few moments later the crowd is scanning the sky, as an alert observer spots a flock of hawks—almost at the limit of vision—and passes the word to the announcer. Few birds get by unnoticed.

The trips are planned by the Academy's Director of Education, Charles E. Mohr,

who was president of the American Nature Study Society from 1943 to 1946. His choice of the title "Expeditions for Everyone" for the Nature trips was in response to the numerous inquiries that the Academy, like other museums, gets from persons eager to go to Africa, Asia, or other distant places on museum expeditions.

"There are remarkable natural phenomena to be witnessed even close to our greatest cities, which museum naturalists have long known about," says Mohr. "We are trying to share those rich experiences by introducing the public to places of natural beauty and interest, often nearby but unexpected."

The public evidently likes this form of expeditioning, for 2500 persons attended the Academy trips last year. They have dug for marine fossils, hammered out mineral specimens, waded through marshes to see gallinule and bittern nests, and crawled into caves to find hibernating bats.

Botanical trips are made to the nearby Pine Barrens of New Jersey, to wildflower preserves and arboretums, and to places where giants of the original forest—designated "Penn Trees"—still stand. Plant collecting is frowned upon, but opportunities are offered on certain trips to collect insects.

Trips are made at various times, generally Saturday or Sunday afternoons, but all-day and weekend trips are arranged at intervals, and in summer there are evening trips. Bird trips often start early. At 7 A.M. on Sunday mornings, in late April and May, six bird walks start simultaneously in various city or suburban areas. Leaders for the bird walks are drawn from Philadelphia bird clubs.

Leaders for other trips include, besides Mohr, museum curators, college professors, and amateur naturalists many of whom are teachers. All the leaders are experienced in interpreting Nature in simple, nontechnical language.

"Once people are introduced to the fascinating natural world about them," Mohr declares, "they want to know more about it. Hundreds of our 'Expeditioners' take our adult courses, join one or more of the natural history societies that meet at the museum, attend our lectures, and become members of the Academy. We are convinced that people everywhere are eager for recreational and educational programs of this type. Most communities could operate Expeditions for Everyone."

Growing Lilies

Garden Lilies. By Alan and Esther Macneil, New York, 1946. Oxford Book Company, 225 pages. Illustrated. $3.50.

This is a dirt gardener's handbook, written with the clear, uncomplicated purpose of helping the lily grower get the most out of his flowers. Such a work is long overdue, for authoritative books on lily growing for American conditions have been few and far between. The last appeared in 1939, and since then many important new hybrids have been created, and greatly improved techniques of culture and propagation evolved.

Dollars by the thousands have been spent, and untold heartaches suffered in the attempts of amateurs—and many professionals—to grow healthy, happy lilies. This new and attractive book, which now makes available the results of much of the past decade's experimentation, should be a helpful guide in solving many of these problems. The authors, Alan and Esther Macneil, are among the best known lily growers in America, and have brought to the book a rich harvest of their own years of experience in dealing with lilies.

It should be especially helpful to the lily gardener who, at the outset, is confronted with the great welter of species, varieties and forms commercially available to him, but who, through lack of knowledge as to the proper selection, may be dooming himself to failure. New and radical departures in lily propagation, and improved methods of dealing with lily diseases, add to the value of this book. There is a chapter on the history of the lily, tracing its development from early days to the present time; there are excellent illustrations and helpful lists of species. There is a comprehensive list of lilies with their descriptions, their characteristics, idosyncrasies, and individual needs. There is a well-selected bibliography, and finally, to bring joy to all those who have suffered under slovenly indexing, there is a carefully chosen index.

Bulbs are expensive and many lilies are capricious—whoever tries growing them will save money and avoid failures by following the expert guidance of this newest of lily books.—T. G.

Cornell Leaflet

"Microbes" is the title of the Winter 1946-1947 Cornell Rural School Leaflet, a children's number written by Lois M. Hutchings. The leaflet presents a program of experiments with these smallest living things.

SPARROWS

(Continued from page 173)

ing pattern that forbids flocking in most species. Thus, flocking or non-flocking does not result from any moral quality, but from ancestral food-getting habits. Besides our alien sparrow, some native sparrows and other seed-eaters are flock-feeders. These include the winter-visiting longspurs, snow-buntings and redpolls, and, in other groups, the gulls, terns, some shore birds, the passenger pigeon of other days, and many others. —ED.

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1 each or 8 plants for $1.00
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10 each or 80 plants for $8.00

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All orders promptly acknowledged

FREE CATALOG:
Hardy Wildflowers & Ferns, Hardy Perennials

LOUNSBERRY GARDENS
OAKFORD, ILLINOIS

HENSLOW'S SPARROW

(Continued from page 189)

pines. Thus his entire life he spends in the jungle of the grass. There he feeds, courts, mates, and nests. Only when he is prompted to sing his quaint and simple song does he leave its depths and perch out in the open, atop some low bush, fencepost, or tall weed-stalk, just inches above the waving grass. If the tall grass goes he must go, for he is a part of it.

NAVIGATIONAL STARS

(Continued from page 212)

of the fifty-five navigational stars. Navigators generally seem to prefer to call these brightest stars by their names, even where the astronomer will choose the often more easily pronounceable Alpha, Beta, or Gamma, or other Greek letter, followed by the name or abbreviation of the constellation. Rarely would one hear an astronomer call Beta Ceti by its Arabic name of Deneb Kaitos, or Alpha Persei by the name of Marfak. There are a surprisingly large number of Arabic names among the brightest stars, maybe not so surprising when one considers that the Arabs were a nomad race and well acquainted with the stars. More than half the names of these bright navigational stars are Arabic. The name Deneb, meaning End of the Tail, is not confined to one constellation alone. Deneb, in Cygnus, is in the tail of the Swan; Deneb or Denebola, in Leo, is in the tail of The Lion; Deneb Kaitos is in the tail of Cetus, The Whale. Scorpio, The Scorpion, also has its Deneb.

In the southern hemisphere one finds that there are certain constellations, formed in more modern times, that have no individual names for their stars. For example, the second magnitude star so often used in navigation in the southern hemisphere, and known simply as "Peacock," is the brightest star in the constellation of Pavo, which means The Peacock.

It is not difficult to learn the names of the twenty brightest stars in the heavens, and to be able to identify them, or as many of them as are visible in our own latitudes, which is generally about half the total number visible in both hemispheres. On occasion one might find it of real value to have this knowledge, for one may lose his way on land, as well as on the sea or in the air, and under such circumstances a knowledge of the stars might be put to a very practical use.

In April, Mercury will be in the morning sky before sunrise throughout the entire month. It will be at western elongation, and farthest from the sun in angular distance, on April 5, but this is a poor time of year to observe the planet in the morning, for it will be at that time less than ten degrees above the horizon at sunrise. During the rest of the month it will be approaching the sun. Venus is still in the morning sky and low in the southeast at sunrise. It is approaching the sun, and its phase is approaching that of full moon. Mars is now in Pisces, and is so near to the sun that it is seen with difficulty before sunrise. Jupiter is in Libra, rises about two hours before midnight, and is visible for the remainder of the night. Saturn is in Cancer and in quadrature, ninety degrees east of the sun, on April 23. It will then be near the meridian at sunset and will set near midnight. Mercury and Mars will be in conjunction on April 19, but both planets will be too close to the sun to be seen.

WHEN APRIL COMES

(Continued from page 204)

safely skip a year.

Never use anything but the best in lawn seed. Cheap seed is always a poor buy. For the shady spots, use a shady lawn mixture. And if your lawn is badly infested with plantain, dandelion and other noxious weeds, you may want to try the new 2, 4-D, or one of the other weed killers. These will not kill the crab grass, however. If your lawn is overrun with this pesky annual, you will have to do hand weeding or take other strenuous measures to eliminate it. One of the best methods is to feed the good lawn grasses generously so that they can hold their own with the invaders. If your lawn grows tall enough to need mowing, set the cutter bar high; don't try to shave it.

Yes, April is *the* garden month. May will be warmer and more settled. There will be more flowers in bloom and fruits of the garden will begin to come in. But April is the exciting time when the annual miracle of resurrection and growth occurs before our very eyes.

THE SCHOOL PAGE

(Continued from page 213)

and all races would be dead heats. Similarly, there is no such thing as a teacher, a laborer, an industrialist, a politician, a bum, or just a man. We should be thankful that we are all different, that there is no such thing as just a warbler, or a sparrow, and even more thankful that we happen for the present at least to live in a country where these individual differences have an opportunity for expression and for development according to our own interests. Since these obvious differences exist, it seems only reasonable that there should be some differences in rewards received. If one man is willing to work, while another man takes time off to change his pants after walking to the dressing room at the rate of half a mile an hour, it should seem only just that the worker should have some added reward. Sure the constitution is right in assuming that all men should have equal opportunity. Honestly, now, who would really want to be just a wahbla? Would you not rather be the yellow warbler making the most of the opportunities presenting themselves in the shrubbery around your house? Petrillo has no control of him, and see how genuinely happy at least one musician is. Would you rather be an old hen with life and death planned for you?

Faithful Sparrow

Beth M. Carpendale and her sister live in a private house in New York City. One evening in October, 1945, they noticed a sparrow settling itself close to an always-screened window, which is kept slightly opened, in the upper hall. The bird has been there every night since that date. A candy box was thumbtacked to the window frame as protection from rain and snow, and the sparrow seemed to appreciate it. In summer the bird goes to bed about eight, in winter about four. No food has ever been provided on the window sill, although the birds are fed in the yard, but, unerringly, the sparrow comes nightly to the same spot, and has been coming for more than fifteen months. No light is turned on in the upper hall lest the bird be disturbed. It has been noted that on warmer nights the bird has its face outward; on cold nights as close to the screen as possible.

Forestry Report

Foresters in particular and conservationists in general will find much important material in "Problems and Progress of Forestry in the United States." This 112-page report of the joint committee on forestry of the National Research Council and the Society of American Foresters is published by the latter organization, 825 Mills Building, Washington 6, D. C., at $1.75. The report is divided into five main sections, dealing with the forest situation in the United States, public responsibilities and action in forestry, problems of private forestry, public action in advancing private forestry, and education and research in forestry. The results of an immense amount of research are packed concisely into the pages of the report.

ANSWERS TO "SHAPED LIKE A ?"

1-t; 2-k; 3-z; 4-h; 5-n; 6-a; 7-q; 8-o; 9-b; 10-s; 11-d; 12-p; 13-f; 14-w; 15-m; 16-y; 17-v; 18-j; 19-g; 20-c; 21-l; 22-x; 23-r; 24-e; 25-i; 26-u.

THE READER'S MARKET

A place where members of the American Nature Association and readers of Nature Magazine may find many interesting offerings, or may advertise themselves, at low cost, for things wanted; things they have for Sale, for Trade, for Sale or Trade. This is an excellent forum for acquiring or disposing of such items as binoculars, books, cameras and photographic equipment, magazines, sports and outdoor equipment, etc.

GENERAL REQUIREMENTS APPLICABLE TO CLASSIFIED ADVERTISING

1. *Transactions based on good faith:* Transactions are based on good faith and mutual satisfaction. Deliberate misrepresentation, disregard of usual business ethics or the attempt to circumvent these general requirements, when brought to our attention, will result in refusal of further advertising.

2. *All orders subject to these conditions:* We reserve the right to edit all copy to conform with our standards and to reject or discontinue any advertisement which we consider undesirable.

3. *Who may advertise:* This department is an open market trading post. Any individual or firm whose advertisement and methods of doing business meet our requirements may advertise their goods or services.

4. *Rates:* All classified advertisements must be accompanied by remittance. The rate is 15c per word including name and address—minimum charge $2.00. Cash with order.

5. *How to count numerals, etc.:* Groups of figures are counted as one word. Abbreviations consisting of initials or single characters likewise are counted as one word. Hyphenated words are counted as two words.

6. *"For Sale" ads must state prices:* A specific price must be stated on all FOR SALE ads —except that the phrase "write for catalog" may be used when listing real estate or merchandise in quantities.

7. *Conditions of trade or sale:* The condition of binoculars, cameras, instruments, other equipment useful to outdoor lovers, home-owners, etc., advertised for sale or trade must be specified as follows: PERFECT—meaning factory condition; EXCELLENT—meaning new condition, implying negligible amount of use; VERY GOOD—meaning practically new condition, implying little use, with no appreciable wear and only minor surface scratches or wear; GOOD—meaning moderate condition and with only moderate wear; FAIR—meaning no parts missing necessary to use, reasonable wear inside and out; POOR—meaning marred appearance or badly worn.

8. *Non-specific phrases barred:* Phrases such as "highest" or "top prices paid", as well as any other so-called "auction-type" phrases are not acceptable. The terms "fair price paid" or "state price wanted" may be used.

9. *Blind ads not acceptable:* Box number or blind ads will not be accepted. Give your complete name and address to insure prompt delivery of all mail or telegraph replies.

10. *Requesting privilege of examination:* Purchasers desirous of examining merchandise before acceptance should request shipment by express C. O. D. with examination privilege. This procedure permits the purchaser to inspect the merchandise in local express office and authorizes the express company to return unsatisfactory merchandise at shipper's expense.

11. The association will not accept for publication in NATURE MAGAZINE, advertisements of firearms, ammunition, or patent medicines.

12. *Responsibility for illegible copy:* Type or print advertisement plainly as we cannot be responsible for errors due to illegible writing.

13. *Closing date:* The closing date of all advertisements is the 20th of the second month preceding month of issue.

ANTIQUE GLASS FOR SALE

MOON AND STAR: List for stamp. Forrest Bowers; Doylestown, Penna.

AUTOMOBILE

1947 Superignitioniter $5.50. Atomic starting, pep, mileage. Personal body building course with weights 100#, $18.75. 3800 used correspondence courses. Catalogue 25¢. E. G. Sales & Mfg. Co., 55U East 149th St., New York 55.

BOOKS

BECOME FINANCIALLY INDEPENDENT! The rules of acquiring wealth are explained fully in the book "Seven Cures for Lean Purse." Send $1.00 for postpaid copy. Satisfaction guaranteed, Bedard Publications, P. O. Box 637, Detroit 31, Mich.

ANALYZE handwriting for fun, knowledge, and profits! 10 complete lessons, and FREE analysis of your writing, $1.98. Details free. Satisfaction guaranteed. N. W. Oliver, Box FC, Mansfield, Penn.

BOOKS—SAVE MONEY, Free Prizes. You select your prize or cash. Best Sellers, details for stamp. Prices slightly above WHOLESALE. Thomas J. Schmitt, Box 3253, Terminal Annex, Los Angeles 54, California.

NATIONAL GEOGRAPHIC MAGAZINES 1888—1947, any issue. Free literature. Periodical Service, Box 327-N, Swarthmore, Pennsylvania.

BOOKFINDERS! (scarce, out-of-print, unusual books) Quickly supplied. Send wants. Clifton, Box 1377nm, Beverly Hills, Calif.

BOOKS, PHOTOS (Glamour). Girl portraits (imported). Details 10¢. Barringer, 1242 Lilac Place, Los Angeles 26, Calif.

FREE BARGAIN CATALOGUE of books. All subjects. National Booksellers. 1182 Broadway, New York 1.

BULBS

BULBS FROM HOLLAND. Catalog describing hundreds of varieties of Tulips and Daffodils free for the asking. J. Heemsherk, c/o P. van Deursen, HASSENHEIM—HOLLAND.

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GIANT living Silk Moth Cocoons: 15 mixed for $1.00. Living Praying Mantis Egg Masses for biological control of insects; 12 for $1.00. Postage extra. National Nature Supply Laboratories, P. O. Box 47, Station "E", Brooklyn 7, New York.

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BUTTERFLIES: 20 named from U. S. including parnassius, $2; 20 world tropicals including gorgeous urania, $2; 10 from Mexico, $1; living cocoons. M. Spellman, 2781 Grand Concourse, New York 58, N. Y.

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CAMERAS—FILMS—HOME MOVIES. Photo supplies. Free catalog. Dayton Film, Inc., 2227 Hepburn, Dayton 5, Ohio.

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ACREAGE-HOMES, within 60 miles New York City. Send for list. Paul Boughton, Farm Broker, Warwick, N. Y.

FIELD GLASSES

SKYSCOPE, the new 3½" reflector. Precision ¼ wave aluminized mirror. Sixty power Ramsden type eyepiece. Equatorially mounted on sturdy metal legs. Used by schools, universities. Price complete $19.75. Write for descriptive literature. The Skyscope Company, Inc., 475 Fifth Ave., New York 17, N. Y.

60 POWER TELESCOPE, $2.95. 250 power microscope, $2.45. Send for free catalog of Telescopes, Binoculars and Microscopes. Brownscope Company, 24 West 45th St., New York.

GAMES

TRUE SECRET of Ventriloquism. First time published. Free booklet. Quakerbush, Big Flats, New York.

GENEALOGY

TRACE Your Family History with "Guidex" Genealogical Research Guide—$3.00. Lists 1000 Sources, Indexes, and hints. Family Guidex, P. O. Box 829-N, Annapolis, Maryland.

HOBBIES

EARTHWORM CULTURE. A fascinating hobby; profitable home industry. Write for valuable free bulletin-review on "Earthworms: Their Intensive Propagation and Use."—Thomas J. Barrett, Earthmaster Farms, Box D-488, Roscoe, California.

YOU CAN ENTERTAIN with chalk talks. Catalog 10¢. J. G. Balda, Cartoonist, Oshkosh, Wis.

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INDIAN CURIOS

INDIAN RELICS. 10,000 new items. Lists and arrowhead 15¢. Williams, 405 Monroe Street, Green Bay, Wis.

4 FINE ANCIENT Indian Arrowheads $1.00. Stone Tomahawk, $1.00. Flint Knife, 50¢. Spearhead, 50¢. List free. Lear's, Box 569, Galveston, Texas.

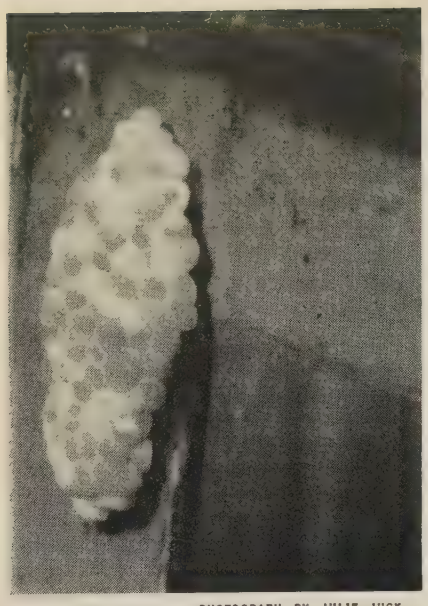
INVESTMENT PROPERTY

FOR SALE: 800 acres in beautiful hill country eighteen miles north west of San Antonio, Texas. Located between two highways and will soon be suburban property. For information write Gilbert M. Denman, San Antonio Loan & Trust Bldg., San Antonio, Texas.

KODACHROMES

KODACHROMES sent on approval. Two-inch kodaslides of Colorado and the Southwest. Scenes and nature subjects, 50¢ each. Free list. Paul Nesbit, Estes Park, Colorado.

KODACHROMES OF THE NATIONAL PARKS AND MONUMENTS. Flora, fauna, scenery of Yosemite, Grand Canyon, Yellowstone, Glacier, and others. Original $1.00, duplicates $.50. Sample slide of Yosemite Firefall or Moonrise from Glacier Point $.50. Send for free list. Douglas Whiteside, Best's Studio, Yosemite National Park, California.



PHOTOGRAPH BY JULIE JUCK

THE MYSTERY SNAIL

By Ralph W. Dexter

The mystery snail, *Ampullaria cuprina*, has been introduced into the United States from Central America, primarily as an aquarium snail. It greatly resembles the Japanese snail in both size and configuration, but is quite different in its reproduction. Whereas the Japanese snail is a live-bearer, retaining its eggs in the uterus until the young snails are formed, the mystery snail lays its eggs in a large cluster of cells. These clusters are deposited at night, when they are fastened on the sides of the aquarium well above the surface of the water. They are usually about one-half of an inch in width, and between one and two inches long. Each cluster consists of numerous cells, which are typically five- or six-sided, resembling somewhat the cells of honey-comb although not quite so regular in form and symmetry. The cells are about one-sixteenth of an inch across. They are made of thin sheets of lime, and they are massed together in a semi-cylindrical cluster. In the center the cells may be packed three or four deep. When nearly deposited the clusters are uniformly cream-colored. The cells are filled with a colorless and tasteless viscous liquid. After several days certain cells begin to turn a light, ash-gray color while others remain unchanged. Gradually, the ash-gray darkens and becomes almost black (notice the dark cells among the cream colored ones in the picture). If one of these should be opened, one would find a single young snail within, giving the cell its dark color. Two weeks are required for development under ordinary laboratory conditions. Once the snail is fully formed, it turns and twists in its cell, eventually pushing the thin wall through with its foot. As the snails are liberated, they drop into the aquarium water. The clusters must be kept in a moist atmosphere or there is danger that the cells will become desiccated before development is completed. Clusters removed from the aquarium hatched out snails when they were maintained in a humid, confined space, but those that were exposed to room conditions failed to hatch living snails. A glass cover over the aquarium will keep the moisture conditions suitable for hatching. Apparently all of the cells do not receive a fertile egg, since some never hatch a snail. Many egg clusters have been deposited on the walls of one of our aquarium at Kent State University over a period of several months. The snails were purchased from William Tricker, Inc., of Independence, Ohio.

Probable Paralysis

The appropriations for Federal aid to the States in wildlife restoration come from a fund produced by an excise tax on sporting arms and ammunition. Although much good has been done, there is the usual proportion of hypocrisy, a popular use of the wildlife "restoration" allotments being for the establishment of public shooting grounds. However, from the viewpoint of hunters, the movement has been a great success, and anglers are seeking parallel legislation to advance their interests. It should be pointed out, however, that, as a system of government, the impounding of taxes paid by a special group for the benefit of that group, if widely extended, can lead to utter paralysis of the appropriating function of legislatures. The American principle of denying special privilege should be re-emphasized and acted upon before too many groups share this selfish and destructive idea of having their taxes spent for their own benefit.

Glacier Hiking Trips

Word comes from H. Frank Evans, who calls himself "The Trail Merchant", that he has perfected his plans for his 1947 conducted hiking trips in Glacier National Park. There will be four 8-day and three 10-day trips in the West Lakes District of the Park. The trips are for hikers only and each trip is accompanied by a naturalist. Pack animals carry all the equipment and supplies. Full details may be obtained from H. Frank Evans, Polebridge, Montana, which is located on Glacier's wild northwest side.

Trail Walkers

Ernest A. Dench, Ho-ho-kus, New Jersey, sends us the usual attractive schedule of events for the Woodland Trail Walkers through May, 1947. This live-wire hiking group has grown steadily and continues to offer much to the hike-minded of New York City and northern New Jersey.

Three-Time Champ

Wake of Darhill, pictured with young Frank Minninger of Detroit, did not go to war as did his brothers and sisters, but he is a graphic indication of why the German Shepherd dog was so popular in war work with the Armed Forces. Intelligence stands out in this dog. Many people still seem to think that these dogs are vicious and unreliable, which is far from true. In fact, Wake of Darhill has three times won the award of C. D.—Companion Dog—for obedience. Both his parents are international champions.

Asian Mammals

Mammals of Eastern Asia. By G. H. H. Tate. New York. 1947. Macmillan. 366 pages. Illustrated. $4.00.

This is the latest addition to the growing library comprised in The Pacific World Series brought out under the auspices of The American Committee for International Wild Life Protection. Dr. Tate, who is Associate Curator of Mammals at the American Museum of Natural History, treats with the varied mammalian life found from the bleak tundra of the Arctic to the steaming jungles of Burma and Malaysia, and from Lake Baikal, the Gobi Desert and Tibetan plateau in the west, eastward to the shores of the Pacific. Many of the forms described are known to Americans only in zoos, and some are not known to them at all.

Wood Specimens

About a year ago we carried a note that Allen G. Miller of Kalmia, North Carolina, would be glad to send, for the cost of postage, wood specimens from his vicinity to anyone desiring such specimens. He received a large number of requests, some for woods he did not have. So he gathered many of these and now has a supply that he would be glad to send out on the same basis.

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EW! Assemble 6 different exciting sea shell nimals, easily. Complete kit, illustrated instruc-on $1. Cameo shell brooch, earring kit complete 1. Big Jewelry Making Kit, $3.50. Illustrated nstruction Booklet 35¢. All postpaid. Complete HELLCRAFT supplies wholesale. SHELART, 027½ 6th St., South St. Petersburg, Florida.

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"ROMANCE IN STONES." Arizona rare min-rals. Collectors or museum grade, 12 miniatures, ssorted, colorful, brilliant, genuinely rare, $3. am Parker, 2160 East Van Buren, Phoenix, rizona.

) All Different Diamond sawed cabachon blanks eady to grind and polish into ring stones, $2.50 ostpaid. Minerals and gemstones on approval. r. Ralph Mueller, 3701 Valentine, Kansas City 2, lissouri.

WAP $500.00 Collection rare Mexican Opal Ca-ochons; watches; printing; mimeographing; ms; for Guns; electric motors, fans, lapidary quipment; gems; hobby collection. Neon Bazaar, ox 503, Calexico 7, California.

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NDENTIFY and PROTECT your garments and nens with washable "Heat-It-On" name tapes. pplied easily with hot iron. 75 per $1.00. Arrow abel Co., Box 31, Sta. P., Brooklyn 12, N. Y.

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HOW DAHLIA ROOTS true to name, or trade or good movie camera. G. Van Olst, Dolgeville, New York.

MEXICAN JUMPING BEANS. July to Decem-er delivery. Order now. Dozen 25¢; hundred 1.00; thousand $5.00. Mexican Products, 126 N. Main, Tulsa, Oklahoma.

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SEA SHELLS

SHELLS FOR SALE. Land and Marine; Cape Cod. Special 12 for $1.00 in box; Lists on request. Mrs. F. K. Hadley, Box 33, West Newton, Mass.

ARE YOU INTERESTED in Sea Shells? New Directory of collectors being prepared. Registration free. Price final list $1.50. John Q. Burch, 4206 Halldale, Los Angeles 37, California.

FOSSILS FOR SALE. Cabinet specimens 25 species $3.00. C.O.D. Lists. Carrie B. Williams, Clarksville, Ohio.

SPORTING GOODS

3000 BARGAINS, Firearms, war relics, binoculars, catalog 40¢. John's Gunshop, Runnemede, New Jersey.

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1,000 GRABBAGS, 15¢ each. Special Bags 25¢. Andy, 630 Bingaman, Reading, Pennsylvania.

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GLASS EYES. Made in OUR factory. All kinds of Taxidermists' supplies. Complete catalog FREE. J. W. Elwood Co., 223 Elwood Bldg., Omaha, Nebraska.

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RHODODENDRON, MOUNTAIN LAUREL, Hemlock, Azaleas, Dogwood, Red Maple. 2 to 3 feet, 5 for $1.75, 10 for $3.00, 25 for $7.00, 100 for $25.00. 3 to 4 feet, 5 for $2.50, 10 for $4.50, 25 for $10.00, 100 for $35.00. Forest Evergreen Co., Doeville, Tennessee.

WILDFLOWERS

WILD FLOWERS: Trees, shrubs, vines, orchids-perennials. 10 mixed trillium bulbs fifty cents. Free catalogue. Three Laurels, Marshall, N. C.

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I WANT New Writers to cash hundreds of checks for $1 to $100, offered each month. The easiest way to write for pay. No previous experience necessary. Send for free details. No obligation. Saunders M. Cummings, 467-N1 Independence Building, Colorado Springs, Colo.

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Under the Microscope

By JULIAN D. CORRINGTON

OVOGENESIS

MAN'S dependence on his fellow members of the animal kingdom is a never-failing source of wonderment and interest to students of the life sciences. Entirely apart from the larger and obvious uses of animals as food, in farming, for sports, and of animal products, as leather or ivory, the human species owes a great deal of knowledge of its own makeup to our lowlier brethren. Before we can employ a new drug or serum on ourselves, its effects are tested on guinea pigs or monkeys. Solution of the pellagra problem came from unraveling the mysteries of black tongue in dogs.

In the present series of articles, however, we are concerned particularly with sources for most of the factual information about early human development and human heredity, which cannot be observed directly in their entirety or achieved by use of the experimental method. We owe the basic concepts of spermatogenesis, as explained in the preceding account, to work with grasshoppers, wherein also the fundamental plan of sex determination was discovered, as will be discussed later. The vinegar fly, *Drosophila melanogaster,* has been called the "biological Cinderella" since its intensive study has led to such exhaustive knowledge of advanced details in genetics.

A still less plausible creature furnished material from which the intricacies of ovogenesis, fertilization, and the physical machinery for Mendelian heredity were first explored. This animal is the common roundworm parasite of the horse, *Ascaris megalocephala,* found in the intestine. It is a cylindrical, white, unsegmented worm, of the size and proportions of a big earthworm, and is one of the largest members of the group termed nematodes. Other species of *Ascaris,* or related genera, infest practically all of the higher animals, including man.

In 1887, the Belgian cytologist, Edouard van Beneden (1845-1910), published the first of his papers dealing with fertilization phenomena in *Ascaris megalocephala,* introducing the scientific world to an animal, repulsive to the fastidious individual who shuts his mind to all the more sordid or ugly facts of life, but attractive to the biologist, who sees here an example of perfection of adaptation to a peculiar mode of living. Van Beneden's introduction, however, had to do with cytology and specifically to the fact that the cells of this worm possessed only four large chromosomes. Here was a species whose chromosomes were so few in number that they could be followed individually and with relative ease through all of their comings and goings during those critical periods before, during, and after fertilization, on the consequences and interpretation of which hang so many important conclusions in the attack on the problem of continuity of life.

As studied today in the laboratory course in general biology, embryology, or genetics, *Ascaris* ovogenesis slides comprise a most valuable and fundamental material. A female worm is killed in hot water, dissected, and the pair of long uterine tubes, filled with eggs, removed and fixed. They are then sectioned lengthwise, and the thin sections stained with iron hematoxylin to color the chromosomes a deep black or blue-black. At first, the eggs are naked and easily sectioned, but as their maturation progresses they acquire a tough shell. The procedure of fixing and cutting through a resistant shell, within which is a soft, delicate protoplasm, provides a difficult problem in microtechnique, and good slides require considerable practice and experience on the part of the worker. As a rule, only a few people in the United States at any one time possess this specialized skill and knowledge, so that university laboratories, and, often, the supply houses themselves, depend upon such experts for their *Ascaris* slides, the demand for which is steady and considerable.

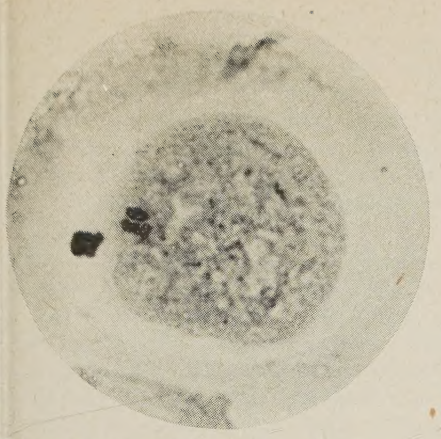
In common with other animals, *Ascaris* eggs undergo two specialized mitoses, termed meioses, and one of these is equational, the other a reductional division, the performance occurring by tetrad formation, as described for grasshopper spermatogenesis last month. A feature peculiar to egg maturation has to do with the division of labor in fertilization between the two germ cells, the sperm becoming minute, elongate, and motile, the egg large, inert, and with a quantity of stored food, the yolk. In order to conserve this yolk, needed by the future embryo, each of the two divisions is very unequal in its parceling of the cytoplasm and contained food. The division of the nucleus is exactly equal, as usual, but the meiotic spindle moves over to the periphery of the cell so that when the cytoplasm is pinched in two, following nuclear division, only a tiny amount of cytoplasm goes into one cell, its mate receiving almost all of the nutritive content. The small cell thus pinched off is a *polar body.* It has its full share of nuclear substance, but very little cytoplasm, and while it could be fertilized, no development could ensue because of lack of stored food, and it soon dies and disintegrates. Polar body formation is to be regarded as a sacrifice play; three potential eggs out of four are sacrificed so that one may live and fulfill its function as a reproductive cell.

The features unique in each sex in maturation, then, are the transformation period or spermiogenesis in the male, wherein the spherical spermatid becomes an elongate spermatozoön,

Primary ovocyte, Ascaris. Sperm nucleus in center; two tetrads near edge.

Anaphase, first meiosis, Ascaris.

Telophase, first meiosis, Ascaris. First polar body thrown off.



Completion of second polar body, Ascaris.

and for which there is no corresponding stage in the female, and polar body formation in the female, resulting in one functional egg out of four, whereas, in the male, four fully equivalent and functional sperms result from each primary cell.

One would suppose, in thinking the matter over in advance, that the fully mature sperm cell, with its monoploid number of chromosomes, would enter the fully mature egg or ovum, also monoploid. Upon such union, the diploid number of chromosomes is restored, the fertilized egg and each of its subsequent daughter cells having a double set of chromosomes, one set from the father, one from the mother. Such is the case in some animals, but most of them exhibit a precocity in sperm entrance. In *Ascaris*, this is carried to the farthest possible extreme, the sperm entering the primary ovocyte, before either of its meioses are under way. In such a case, the sperm is a mere spectator, and must wait until the egg is ripe before the nuclei of the two cells can mingle their chromosomes on a common spindle. The latter is true fertilization, not the mere penetration of egg by sperm.

Let us now marshal all of these facts and study the sequence of events in *Ascaris* ovogenesis, referring to accompanying illustrations for assistance. The first slide studied is labeled "entrance of sperm" and shows a sperm cell lying within the cytoplasm of the "egg," actually the primary ovocyte. The sperm has previously undergone its own maturation in the testis of a male worm, and is fully mature and monoploid. The primary ovocyte results from mitotic division of an ovogonium, has had neither of its two meioses, and is diploid, like all other body cells. The sperm has a peculiar shape in this worm, somewhat like a bullet, and without a tail. The pointed end is the head, containing the nucleus with two chromosomes, while a single centrosome is prominent in the middle-piece. Entering head first, the sperm swings around so that the middle-piece precedes, and approaches the center of the ovocyte, losing its characteristic appearance by absorption of water, and probably some food material, from its partner's cytoplasm. By the stage shown here, the sperm seems more like a typical nucleus, and remains more or less in this condition while the egg undergoes maturation.

Meanwhile the primary ovocyte forms its chromosomes out of the chromatin threads of its nucleus. The threads approach in pairs (synapsis), then each splits lengthwise, making a quartet (tetrad) in the prophase of the first meiosis. As the diploid number of chromosomes in this species is four, two pairs are formed in synapsis and, when each chromosome splits, two groups of four each are produced; two tetrads. Usually these eight chromosomes can be made out very distinctly in sections where the microtome knife cuts through all of them; i.e., if they lie in the plane of the section. In the first accompanying photomicrograph, the sperm nucleus is seen in the center of the primary ovocyte, while the first spindle has formed, moved off to one edge of the cell, and the two tetrads, each in the shape of a cross, now lie in the middle of the spindle, beginning the metaphase. Each arm of a cross is one chromosome. If the section was at right angles to that shown, yielding a polar view of the metaphase, the chromosomes would be seen as elongate rods rather than as stubby pieces.

In the second photomicrograph, the section does not include the sperm nucleus, but shows instead the anaphase of the first meiosis, with four chromosomes destined to go off into the first polar body, and four to remain with the large cell, which would then be a secondary ovocyte. The conclusion of this division appears in illustration #3, the four chromosomes of the secondary ovocyte showing distinctly, but those of the first polar body already condensed into a small black mass lying against the inner wall of the shell. The four chromosomes of ovocyte II now regroup for a second division, forming two bodies of two each, the dyads. The two chromosomes making up each dyad now disjoin, going to opposite poles, so that the mature ovum receives two, as does also the second polar body. The end of this division is shown in the fourth illustration. The egg is now monoploid and ready for fertilization, the next step being formation of the male and female pronuclei, as described and pictured in our installment for November, 1945.

In a few animals, the first polar body may also undergo a second maturation division. Theoretically there should result from each primary ovocyte, after two divisions, four cells, the ovum and three polar bodies or polocytes, all with full nuclear complements. But since the polar bodies can come to naught, and since the first polar body usually lacks sufficient cytoplasm to provide the energy necessary for a division, it generally does

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not divide. The two polar bodies soon die and disintegrate.

To recapitulate, this time using letters to designate chromosomes; capital letters the contribution from the male parent, small letters those from the female parent:

In the primary ovocyte, chromosome *A* approaches *a* in synapsis, during the first meitoic prophase. They each split lengthwise, making a tetrad of four chromosomes, *AAaa*. If this tetrad lines up on the spindle of the metaphase in such a manner that *AA* go to one pole and *aa* to the other in the anaphase, the division is reductional, the secondary ovocyte and first polocyte receiving qualitatively different material. The second meiosis would then split dyad *AA* into chromatids *A* in one cell and *A* in the other, and disjoin *a* from *a* in the other case. The second division would thus be equational; it is quantitative but not qualitative.

If, on the other hand, tetrad *AAaa* lines up in such position that the first division disjoins one *Aa* from the other *Aa*, then this first meiosis is equational. Each daughter cell would then have the same dyad, *Aa*, and the second division would place chromatids *A* and *a* in separate cells, and would therefore be reductional. If the reduction division precedes, the animal is said to exhibit prereduction; if it comes second, then the case is one of postreduction.

It is purely a matter of chance as to which of the four final cells (assuming the ideal estate of division of the first polocyte) is the mature ovum, and which three are fated to end their days as polar bodies. It will happen as often that the ovum contains *A* as that it will contain *a*, and so for the other tetrad, *BBbb*. The possible combinations of chromosomes in various ova will then be *AB*, *Ab*, *aB*, or *ab*. In other words, four kinds of eggs will be produced, by the law of probability, in essentially equal numbers. There will likewise be four possible kinds of sperms, *AB*, *Ab*, *aB*, or *ab*. Fertilization, like the lining up of tetrads on meiotic spindles, is fortuitous, and with four kinds of sperms fertilizing four kinds of eggs at random, the possible combinations of zygotes will be sixteen, including such types, for example, as *AABB*, *AaBb*, *AaBB*, *aaBB*, and *aabb*. These reshufflings in meiosis and deals in fertilization, like hands received in playing contract bridge, account for numerous forms of variation, universal among all animals and plants that reproduce sexually.

Since van Beneden's discovery, one variety of this worm has been found that has a monoploid number of only one chromosome, with a diploid number of two, the absolute minimum possible. This form has received the name *Ascaris megalocephala univalens*, while the commoner variety, with a diploid number of four, becomes *Ascaris megalocephala bivalens*.

Strangely enough, the species of roundworm found in the pig, *Ascaris suilla*, and that in man, *A. lumbricoides*, though appearing very similar to *A. megalocephala*, are worthless for cytological studies in that their diploid number of chromosomes is 48, far too many to serve as suitable material with which to solve such profound problems. *Ascaris megalocephala* proved to be an entirely unexpected Pandora's box of basic biological truths, and studies with this animal have greatly influenced the warp of twentieth century philosophy.

TRADE NOTES

Zoology An indispensable aid to any research project in animal biology is the *Guide to the Literature of the Zoological Sciences*, by Roger C. Smith, now out in a revised edition. We have seldom seen so much information packed within so small a compass, especially information of such intensely practical value. Here the student or the investigator will find described the mechanics of a library and its various types of filing systems; kinds and use of bibliographies, abstracts, journals, from all countries; the different forms and classifications of scientific literature; how to select a suitable problem; how to prepare a scientific paper; things to do and things not to do; and literally thousands of items of this character. The material is multigraphed on laboratory notebook-sized paper, with a flexible cover. Pp. vii, 114. Burgess Pub. Co., 426 S. Sixth St., Minneapolis 15. 1945. $2.00.

Physics Unless we have been recently exposed to a course in modern physics, most of us feel the need of instruction in the many phases of this subject in order to understand what we read in the papers and magazines. What makes a Diesel engine run? How does a microscope produce a magnified image? What principles govern rocket missiles? How does a radio translate electromagnetic waves into sound? What is polarized light and what are the uses of polaroid? Can radar be useful in peace times? What is diathermy? How are sound movies and television possible? Just what is color? What physical principles govern the weather? How is it that a photoelectric cell can open a door? What makes an atom bomb explode?

These are but random samples from among hundreds of such questions that anyone might wish answered. Two new editions of highly successful books, designed for the general reader, are now out, and we can heartily recommend either or both for those who wish to keep abreast with the rapid expansion of physical science.

The second or Atomic Energy edition of *Physics Tells Why*, by the late Overton Luhr, revised by Ralph Johnson, is a new issue of a work claimed by the publishers of the "Humanizing Science Series" to be the fastest selling of all their scientific books. Although the whole scope of physics is covered, this book amazingly dispenses with mathematics and yet does so without taking the meat out of the subject. This is possible because the author, through teaching experience, mastered an easy, chatty, explanatory style that avoids obtuse technicalities and really explains profound matters in simple terms, based on the everyday experience of the average reader. Each topic is introduced by proposing a question, such as some of those listed above, and answers are then provided, aided by cartoon illustrations from the pen of Ruth C. Schmidt that are, with a few exceptions, effective in aiding the reader to visualize a principle or performance. At the end is a quiz section to help test your knowledge and provide entertainment. Pp. ix, 387; figs. 196. The Jaques Cattell Press, Lancaster, Pa. 1946. $3.75.

From Galileo to the Nuclear Age, by Harvey Brace Lemon, is the new revision of another very successful presentation of physics. First issued as *From Galileo to Cosmic Rays*, this book is one of the noteworthy University of Chicago Press "New Plan Texts," widely used in both high schools and colleges, and entirely suitable for the private reader. The content is thorough, the writing authoritative, including but not depending upon mathematics; the book is beautifully planned and printed, with a wealth of cartoon illustrations by Chichi Lasley, and with many photographs and three-dimensional stereophotographs. Here, again, information is woven with interest through the medium of a conversational style and the relating of phenomena to familiar surroundings and experiences. If you have never inspected one of these new-plan books, you will be surprised at how stimulating and different a text on a subject usually thought of as dry and academic can be, with the right combination of progressive author and publisher. Pp. xviii, 451; plts. 99, figs. 336. Univ. of Chicago Press, 5750 Ellis Ave., Chicago 37. 1946. $5.00.